

Flora of Chiapas

PUBLISHED BY THE CALIFORNIA ACADEMY OF SCIENCES

Part 5

COMPOSITAE – HELIANTHEAE S.L.

John L. Strother

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January 26, 1999

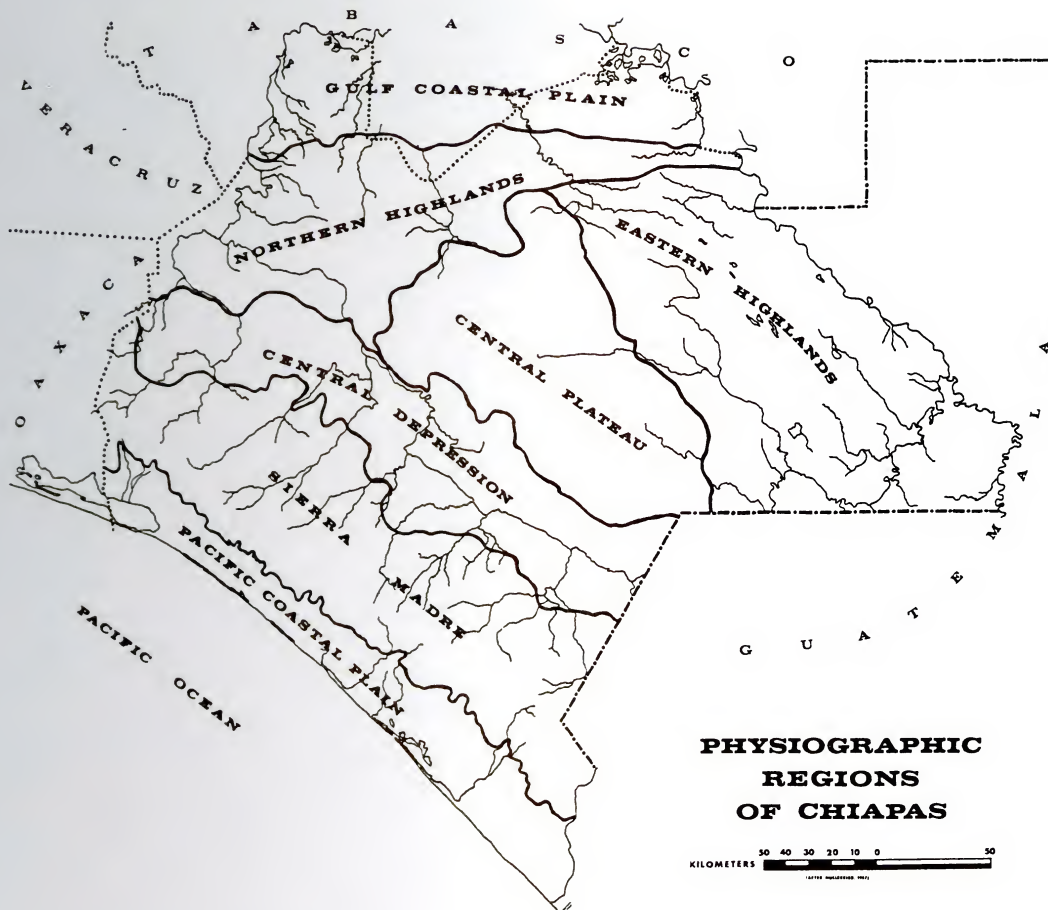


LIST OF FAMILIES FOR *FLORA OF CHIAPAS* WITH NUMBER OF SPECIES KNOWN AT PRESENT
(those listed in *Flora of Guatemala* are in parentheses)

Ferns & Allies	630 (653)	Dioscoreaceae	31 (24)	Oleaceae	18 (12)
Conifers	34 (23)	Droseraceae	3 (1)	Onagraceae	44 (46)
Acanthaceae	131 (133)	Ebenaceae	9 (11)	Opiliaceae	3 (1)
Aceraceae	2 (2)	Elatinaceae	1	Orchidaceae	514 (527)
Actinidiaceae	18 (12)	Elaeocarpaceae	8 (7)	Orobanchaceae	1 (1)
Aizoaceae	7 (5)	Ericaceae	44 (36)	Oxalidaceae	23 (17)
Alismataceae	7 (7)	Eriocaulaceae	2 (13)	Papaveraceae	9 (9)
Antarctanthaceae	50 (46)	Erythroxylaceae	8 (7)	Passifloraceae	42 (42)
Anacardiaceae	22 (18)	Euphorbiaceae	256 (212)	Pedaliaceae	1 (1)
Annonaceae	30 (31)	Fabaceae	703 (553)	Phytolaccaceae	11 (13)
Apiaceae	59 (50)	Fagaceae	39 (26)	Piperaceae	106 (158)
Apocynaceae	65 (70)	Flacourtiaceae	40 (31)	Plantaginaceae	5 (4)
Aquifoliaceae	18 (10)	Garryaceae	2 (2)	Platanaceae	1 (1)
Araceae	106 (65)	Gentianaceae	35 (36)	Plumbaginaceae	3 (3)
Araliaceae	20 (22)	Geraniaceae	13 (7)	Poaceae	461 (455)
Arecaceae	58 (63)	Gesneriaceae	59 (57)	Podosternaceae	3 (4)
Aristolochiaceae	17 (15)	Haemodoridae	1 (1)	Polemoniaceae	10 (10)
Asclepiadaceae	77 (90)	Haloragaceae	3 (3)	Polygalaceae	30 (34)
Asteraceae	603 (611)	Hamielidaceae	2 (3)	Polygonaceae	44 (55)
Balaustophoraceae	1 (1)	Hernandiaceae	3 (3)	Pontederiaceae	8 (8)
Balsaminaceae	3 (2)	Hippocastanaceae	1 (1)	Portulacaceae	7 (5)
Basellaceae	5 (4)	Hippocrateaceae	12 (5)	Potamogetonaceae	8 (7)
Bauhinaceae	1	Hydrocharitaceae	1 (3)	Primulaceae	7 (5)
Begoniaceae	45 (34)	Hydrophyllaceae	10 (7)	Proteaceae	2 (3)
Berberidaceae	9 (3)	Icacunaceae	6 (4)	Punicaceae	1 (1)
Belizaceae	5 (6)	Iridaceae	29 (22)	Pyrolaceae	5 (4)
Bignoniaceae	50 (66)	Juglandaceae	4 (5)	Quinaceae	(1)
Bixaceae	1 (1)	Juncaceae	16 (10)	Rafflesiaceae	4 (3)
Bombacaceae	20 (14)	Krameriaceae	2 (2)	Ranunculaceae	21 (18)
Boraginaceae	70 (65)	Lacistomaceae	1 (1)	Resedaceae	(2)
Brassicaceae	31 (34)	Lamiaceae	121 (100)	Rhamnaceae	25 (22)
Bromeliaceae	126 (127)	Lauraceae	96 (55)	Rhizophoraceae	2 (2)
Burmanniaceae	1 (1)	Lecythidaceae	1 (2)	Rosaceae	78 (70)
Burseraceae	5 (6)	Lemnaceae	8 (7)	Rubiaceae	280 (298)
Butomaceae	1 (2)	Lenticeae	2 (1)	Rutaceae	42 (41)
Buxaceae	1 (2)	Lentibulariaceae	9 (17)	Salicaceae	8 (6)
Cactaceae	42 (50)	Liliaceae s. l.	124 (100)	Sapindaceae	64 (63)
Callitrichaceae	3 (2)	Linaceae	5 (4)	Sapotaceae	41 (33)
Campanulaceae	26 (33)	Loasaceae	9 (6)	Saxifragaceae	11 (8)
Carniaceae	5 (6)	Loganiaceae	29 (24)	Scrophulariaceae	86 (95)
Capparaceae	31 (28)	Loranthaceae	43 (42)	Simaroubaceae	14 (13)
Caprifoliaceae	24 (19)	Lythraceae	47 (34)	Solanaceae	150 (172)
Caricaceae	9 (3)	Magnoliaceae	5 (3)	Staphyleaceae	4 (4)
Caryophyllaceae	36 (36)	Malpighiaceae	56 (49)	Sterculiaceae	34 (28)
Casuarinaceae	2 (1)	Malvaceae	125 (95)	Styracaceae	4 (3)
Celastraceae	52 (27)	Marantaceae	18 (14)	Symplocaceae	11 (10)
Ceratophyllaceae	1 (1)	Marcgraviaceae	6 (10)	Tamaricaceae	2
Chenopodiaceae	5 (5)	Martyniaceae	1 (2)	Theaceae	15 (8)
Chloranthaceae	1 (1)	Mayacaceae	1 (1)	Theophrastaceae	4 (6)
Cistaceae	4 (5)	Melastomataceae	141 (154)	Thymelaeaceae	8 (6)
Cistaceae	4 (5)	Meliaceae	37 (32)	Tiliaceae	41 (25)
Cistaceae	16 (8)	Meliosmaceae	3 (4)	Tovariaceae	1 (1)
Clusiaceae	29 (34)	Menispermaceae	11 (11)	Trigonaceae	2 (2)
Cochlospermaceae	2 (2)	Monimiaceae	7 (3)	Triuridaceae	(3)
Combretaceae	17 (14)	Monotropaceae	2 (2)	Tropaeolaceae	2 (2)
Commelinaceae	64 (40)	Moraceae	68 (64)	Turneraceae	10 (7)
Coniariaceae	4 (5)	Moringaceae	1 (1)	Typhaceae	3 (2)
Convolvulaceae	122 (144)	Musaceae	21 (13)	Ulmaceae	10 (10)
Conariaceae	1 (1)	Myricaceae	3 (3)	Urticaceae	47 (55)
Cornaceae	2 (2)	Myrsinaceae	2 (5)	Valerianaceae	14 (12)
Crassulaceae	31 (17)	Myrsinaceae	61 (61)	Verbenaceae	90 (70)
Cucurbitaceae	56 (52)	Myrtaceae	85 (96)	Violaceae	29 (23)
Cunoniaceae	2 (2)	Nagaceae	1 (2)	Vitaceae	19 (15)
Cyclanthaceae	2 (5)	Nyctaginaceae	31 (24)	Vochysiaceae	2 (2)
Cyperaceae	199 (135)	Nyssaceae	1	Winteraceae	1 (1)
Cyrtaceae	(1)	Nymphaceae	4 (5)	Xyridaceae	2 (3)
Dichapetalaceae	3 (3)	Ochnaceae	10 (7)	Zingiberaceae	14 (14)
Dilleniaceae	8 (8)	Oleaceae	10 (5)	Zygophyllaceae	7 (5)

Total: 8248; 7749

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MAP. Physiographic regions of Chiapas, Mexico (after Müllerried, 1957)

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EDITOR'S PREFACE

The founding editor of the *Flora of Chiapas*, Dennis E. Breedlove, officially retired from the California Academy of Sciences in 1994 following a productive career of 25 years in its Department of Botany. Dennis was hired at the Academy in 1969 as a successor to John Thomas Howell who had recently retired. His interests in Mexican plants reinvigorated the commitment to tropical botany at the Academy and led to significant growth of the herbarium's collections. Dennis collected plants throughout Mexico, but his particular focus was on Chiapas where he worked primarily on floristic and ethnobotanical projects. Some of his important accomplishments include a checklist of the Chiapan flora, editing the first four parts (Introduction, Pteridophytes, Malvaceae, and Acanthaceae) of the *Flora of Chiapas*, and two seminal ethnobotanical studies: *Principles of Tzeltal Plant Classification, an Introduction to the Botanical Ethnography of Mayan Speaking People of Highland Chiapas* (with B. Berlin and P. Raven) and *The Flowering of Man, a Tzotzil Botany of Zinacantán*, Volumes I and II (with R. Laughlin). Dennis is a recognized authority on *Fuchsia* (Onagraceae) and Neotropical *Quercus* (Fagaceae). His collections of plants comprise more than 70,000 numbers, mostly from Chiapas. Dennis now holds the title of Curator Emeritus at the Academy, but devotes his time to pursuits other than systematic botany. Through his collections and publications Dennis Breedlove has provided a solid basis for the continuation of the *Flora of Chiapas*.

Temporarily, I have assumed editorship of the *Flora of Chiapas* series so that publication of completed manuscripts can continue without delay. In Part 5, John L. Strother provides the first of two installments of the Compositae (Asteraceae). It comprises an account of the tribe Heliantheae s.l., which includes 225 of the approximately 570 species of the family in Chiapas. The remainder of the family is currently being prepared by Dr. Strother. Additional treatments of vascular plant families in Chiapas are either being prepared or planned.

THOMAS F. DANIEL
DEPARTMENT OF BOTANY
CALIFORNIA ACADEMY OF SCIENCES
11 SEPTEMBER 1998

CHAPTER 10

The first part of the chapter discusses the importance of the environment in the development of the human mind. It argues that the environment plays a crucial role in shaping the child's cognitive and emotional development. The second part of the chapter focuses on the role of the family in the child's development. It discusses how the family environment influences the child's behavior and attitudes. The third part of the chapter deals with the role of the school in the child's development. It discusses how the school environment influences the child's academic and social development. The fourth part of the chapter discusses the role of the community in the child's development. It discusses how the community environment influences the child's cultural and social development. The fifth part of the chapter discusses the role of the media in the child's development. It discusses how the media environment influences the child's cognitive and emotional development. The sixth part of the chapter discusses the role of the government in the child's development. It discusses how the government environment influences the child's social and economic development. The seventh part of the chapter discusses the role of the culture in the child's development. It discusses how the cultural environment influences the child's identity and values. The eighth part of the chapter discusses the role of the religion in the child's development. It discusses how the religious environment influences the child's moral and spiritual development. The ninth part of the chapter discusses the role of the technology in the child's development. It discusses how the technological environment influences the child's cognitive and social development. The tenth part of the chapter discusses the role of the environment in the child's development. It discusses how the environmental environment influences the child's physical and mental development.

The chapter concludes by emphasizing the importance of a holistic approach to child development. It argues that all these factors are interconnected and influence each other. Therefore, a comprehensive understanding of the child's development requires a consideration of all these factors together.



CHAPTER 11

The first part of the chapter discusses the importance of the environment in the development of the human mind. It argues that the environment plays a crucial role in shaping the child's cognitive and emotional development. The second part of the chapter focuses on the role of the family in the child's development. It discusses how the family environment influences the child's behavior and attitudes. The third part of the chapter deals with the role of the school in the child's development. It discusses how the school environment influences the child's academic and social development. The fourth part of the chapter discusses the role of the community in the child's development. It discusses how the community environment influences the child's cultural and social development. The fifth part of the chapter discusses the role of the media in the child's development. It discusses how the media environment influences the child's cognitive and emotional development. The sixth part of the chapter discusses the role of the government in the child's development. It discusses how the government environment influences the child's social and economic development. The seventh part of the chapter discusses the role of the culture in the child's development. It discusses how the cultural environment influences the child's identity and values. The eighth part of the chapter discusses the role of the religion in the child's development. It discusses how the religious environment influences the child's moral and spiritual development. The ninth part of the chapter discusses the role of the technology in the child's development. It discusses how the technological environment influences the child's cognitive and social development. The tenth part of the chapter discusses the role of the environment in the child's development. It discusses how the environmental environment influences the child's physical and mental development.

COMPOSITAE – HELIANTHEAE S.L.



FRONTISPIECE. *Iostephane trilobata* Hemsley, as figured by an artist of the Royal Botanical Expedition to New Spain, 1787–1803. Reproduced from the Torner Collection of Sessé and Mociño Biological Illustrations with permission from the Hunt Institute for Botanical Documentation, Carnegie Mellon University, Pittsburgh, Pennsylvania.

COMPOSITAE – HELIANTHEAE S. L.

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COMPOSITAE GISEKE. 1792. nom. cons.

Asteraceae Dumortier. 1822. nom. alt.

Herbs (annual, biennial, or perennial), **shrubs**, **vines**, or **trees**. **Leaves** opposite or alternate, sometimes in basal rosettes, rarely in whorls; rarely stipulate; petiolate or sessile, sometimes with petiole bases decurrent on the stems; blades usually simple, often pinnatifid or palmatifid, rarely compound. **Inflorescences**: indeterminate *heads* (also called capitula); each head comprising a surrounding *involucre* of *phyllaries* (bracts), a *receptacle*, and (1–)5–200+ *florets*; individual heads sessile or each borne on a *peduncle*; heads borne singly or variously arranged in usually determinate, rarely indeterminate, *capitulescences*. **Involucres** sometimes subtended by *calyculi* (sing. calyculus, collective term for bractlets immediately subtending the phyllaries proper). **Phyllaries** borne in 1 or more series proximal to (i.e., outside of or abaxial to) the florets. **Paleae** (receptacular bracts) subtending individual florets present or absent. **Florets** bisexual, pistillate, functionally staminate, or neuter (also called neutral); calyx none, instead of sepals each ovary bears (usually) a *pappus* (pl. *pappi*) of bristles, awns, or scales (sometimes in combination in a single pappus) or, sometimes, a minute corona; petals united, corollas (3–4-)5-merous, actinomorphic or zygomorphic (one or both kinds in a single head, see descriptions of *radiate*, *discoïd*, *liguliflorous*, *disciform*, and *radiant* following); stamens (4–)5, alternate with corolla lobes, filaments inserted on corollas, usually distinct, anthers introrse, usually connate, forming a tube around the style (rarely filaments connate and anthers distinct, e.g., Ambrosiinae); ovaries inferior, 2-carpellate, and 1-locular with 1, basally attached, anatropous ovule that develops into an exalbuminous seed with a straight embryo; styles 1 per floret, each usually ringed at base by a nectary, distally 2-branched with stigmatic papillae in 2 lines on, or papillae continuous over, adaxial face of each branch. **Fruits** (technically *cypsela*e, historically called achenes by some authors) usually dry with relatively thick, tough, pericarps, sometimes rostrate (beaked) or alate (winged), often dispersed with aid from pappi.

Genera ca. 1500, species ca. 23,000 (ca. 170 genera, 570+ species in Chiapas): nearly worldwide, especially rich in numbers of species and/or in numbers of plants in arid and semiarid regions of subtropical and lower to middle temperate latitudes.

Inflorescences of composites are called *heads* (or capitula). Arrays of heads are called *capitulescences*; the arrays of heads correspond to arrays of individual flowers (inflorescences) on plants of other families. Terms for kinds of capitulescences parallel terms for kinds of inflorescences: corymbiform, panicleiform, racemiform, spiciform, etc.

In *radiate* heads, peripheral florets (*ray florets*) in one or more series have corollas with zygomorphic limbs and central florets (*disc florets*) have actinomorphic corollas. Ray florets may be pistillate, styliiferous and sterile, or neuter; disc florets are usually bisexual or functionally staminate, rarely pistillate. In *liguliflorous* heads, all florets are bisexual and fertile and have

zygomorphic corollas (*ligulate florets*). In *discoid* heads, all florets are typically bisexual and fertile or functionally staminate and have actinomorphic corollas (in some dioecious species, discoid heads may have all florets pistillate). In *disciform* heads, all florets have actinomorphic corollas and peripheral florets (in one or more series) are pistillate and, usually, have relatively slender corollas; the central florets of disciform heads are bisexual or functionally staminate. In *radiant* heads, all florets have actinomorphic corollas and the peripheral florets have much enlarged corollas and may be bisexual, pistillate, or neuter; the central florets of radiant heads are bisexual.

Heads with all florets of one sexual form (bisexual, pistillate, or functionally staminate) are called *homogamous* (discoid, liguliflorous, and some radiant heads) and heads with florets of two or more sexual forms are called *heterogamous* (radiate, disciform, and most radiant heads).

Receptacles may bear paleae (i.e., each of all but the peripheral florets in each head may be subtended by a bractlet called a palea) or not. Some receptacles that lack paleae may bear acerose enations (e.g., *Gaillardia*), stiff bristles (e.g., some *Cardueae*), or soft hairs (e.g., some *Anthemideae*). Receptacles lacking paleae (or paleate receptacles after paleae have fallen) may be smooth or variously pitted.

The terms *tube*, *throat*, and *limb* have been variously used in descriptions of corollas of composites. In actinomorphic corollas of bisexual and functionally staminate florets, the *tube* is the part of the corolla proximal to the insertion of the staminal filaments and the *limb* is the part that is distal to insertion of the filaments. The limb comprises, proximally, the *throat* and, distally, the *lobes*. The distinction between tube and throat hinges on insertion of filaments, not on external morphology.

The relatively flat portion of a corolla from a liguliflorous head is called a *ligule*; it terminates in 5 teeth or lobes. The relatively flat portion of a corolla of a ray floret (from a radiate head) is called a *lamina*; it terminates in 0–3(–4) teeth or lobes. More or less bilabiate corollas are characteristic of some members of *Mutisieae* and are seldom found in members of other tribes.

In keys and descriptions here, unless otherwise indicated, style and styles refer to styles of bisexual or functionally staminate disc florets, not to styles of ray florets.

Fruits of composites have been called “achenes” because they resemble true achenes. Achenes are dry, hard, single-seeded fruits derived from unicarpellate ovaries. Ovaries of composites are bicarpellate. Fruits derived from ovaries of composites are called **cypselae** (sing. *cypsela*). Morphology of an ovary of a composite at anthesis is often markedly different from the morphology of the mature fruit (*cypsela*) derived from that ovary. References to *cypselae* in keys and descriptions refer to mature fruits, not to ovaries at anthesis.

Shapes of *cypselae* have been used in distinguishing among species, genera, and even subtribes of composites. In most genera, *cypselae* are isodiametric in cross section. In some genera, *cypselae* are characteristically lenticular in cross section. Such *cypselae* are said to be **compressed** or **laterally flattened** if the longer axis of the cross section is \pm parallel to a radius of the head (e.g., *Verbesina* spp.). *Cypselae* are said to be **obcompressed** or **dorsi-ventrally flattened** if the shorter axis of the cross section is \pm parallel to a radius of the head (e.g., *Coreopsis* spp.).

Pappi show a great range of diversity and are often diagnostic for recognition of taxa, especially at rank of genus and below. The various forms of pappus elements intergrade. In keys and descriptions here, the following arbitrary distinctions are made: Cross sections of *bristles* and *awns* are \pm circular or polygonal and have the longer diameter no more than 3 times the shorter diameter. Pappus elements with “flatter” cross sections (i.e., longer diameter of cross section more than 3 times the shorter diameter) are called *scales*, regardless of relative overall lengths of the elements. As used here, “subulate scale” means much the same as “flattened bristle” of other authors. Pliable to stiff pappus bristles with diameters less than 50 μ m are called *fine bristles*; pliable to stiff bristles with diameters greater than 50 μ m are called *coarse bristles* or *setae*. Rigid pappus elements with

more or less circular or polygonal cross sections greater than 100 μm in diameter are called *awns*. Bristles, awns, and scales may be smooth or variously finely to coarsely barbed or plumose. Each scale of a pappus may terminate in one or more bristle-like or awn-like appendages; such scales are said to be *aristate*.

References to pappi in keys and descriptions refer to pappi of cypselae (mature fruits), not to pappi of ovaries at anthesis.

Roughly 23,000 species (ca. 8–10% of the species of vascular plants of the world) are composites; ca. 8.4% (ca. 570 species) of Chiapan species of vascular plants are composites (cf. Breedlove 1986). Here 225 species of Chiapan composites are referred to Heliantheae s.l. and are treated as native or naturalized elements of the flora. Whenever practicable, I have followed (and cited) recent (and sometimes not so recent) revisions or monographs in treating genera for the Flora of Chiapas. Occasionally, I have disagreed with other authors and have adopted more or less different circumscriptions of species and/or infraspecific taxa. My motive has been to achieve greater taxonomic consistency of treatment across the tribe.

For general background on physiographic regions and vegetational formations of Chiapas, see Breedlove (1981). In general, composites are mostly found in warm to hot and mesic to dry habitats and the same is true for Heliantheae in Chiapas. For example, relatively few species of composites are found in the mostly wet lowlands of northeastern Chiapas (Martínez et al. 1994) compared to the numbers of species of composites recorded from the seasonally dry Central Depression.

Format of my treatment of Chiapan Heliantheae is patterned on that of earlier parts of the flora, especially part 2 (Smith 1981), and my treatment is based largely on collections made by D. E. Breedlove housed in CAS and DS. Other collections consulted are indicated in Acknowledgments and in lists of Chiapan collections that are cited for each taxon (see Appendix 1). My citations of nomenclatural type specimens are derived from monographs, protologues, and revisions. Type specimens seen by me are marked with an exclamation point (!) next to the herbarium designator. Collection numbers that were evidently assigned after collection (vs. “field numbers”) are cited within square brackets [] (e.g., numbers assigned by A. Gray to collections made by Fendler); collection numbers that have been variously treated and for which I am uncertain are placed in quotes “”.

So far as practicable, my descriptions have been drawn from Chiapan specimens; for some taxa, other specimens and information in revisions and monographs have also been used. Information enclosed in square brackets [] in descriptions and/or keys refers to characteristics of extra-Chiapan plants. Characteristics noted within parentheses () in descriptions and/or keys may be helpful for identifying the particular taxon and not generally useful in recognition of other taxa. For upper limits of some traits, I have appended “+” to the given range of observed measurements or counts (e.g., leaf length 4–12+ cm, disc florets 10–15+, etc.) to indicate that I suspect the upper limit to be somewhat greater than the observed limit among specimens seen (e.g., leaves longer than 12 cm or florets numbering in excess of 15 have not been seen but are to be expected).

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I am especially indebted to Dennis E. Breedlove for advice, collections, encouragement, and a wonderful trip to Chiapas, including the delicious garbanzo soup. I am also indebted to generations of other collectors whose specimens were invaluable sources as I wrote descriptions and studied distributions (see Appendix 1). I thank P. Bolick, M. Bourell, T. Daniel, L. Flyr, N. Harriman, G. Nesom, J. Panero, J. Pruski, A. Smith, D. Spooner, B. Turner, and J. Villaseñor for generous help with various aspects of the project. I thank W. Burger and M. O. Dillon and the Field Museum of Natural History for permission to reproduce illustrations (as cited herein), especially those by M. Pahl, originally published in *Feldiana*, Bot., vol. 24(XII), as part of *Flora of Guatemala*;

indications of magnification are as given in that work. I thank staff at ARIZ, BM, CAS, COLO, DS, F, G, GH, ILL, K, LL, MICH, MO, MU, NMC, NY, OBI, OS, OSH, POM, RSA, TEX, UMO, UNM, and US for loans and/or hospitality during visits that were wholly or partially devoted to Fl. Chis. I also studied specimens in UC.

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TRIBES OF COMPOSITAE

In recent years, information derived from semantides, especially various kinds of DNA, have led to changes of tribal placement for some genera of Compositae and to consequent changes in some tribal circumscriptions (see discussions in Bremer 1994, and references cited there). For Flora of Chiapas, my tribal circumscriptions mostly follow traditions traceable to Bentham (1873) and earlier; deviations are traceable to suggestions by Robinson (1981) and by authors cited by Bremer and his contributors (1994). Tribal circumscriptions and generic placements accepted here are reflected in the following key to the tribes known to be represented in Chiapas.

KEY TO TRIBES OF COMPOSITAE AS REPRESENTED IN CHIAPAS

- a. Sap usually milky white; heads liguliflorous, florets all bisexual and corollas all zygomorphic, all ligulate (i.e., corolla limbs laminar, linear to flabellate, and 5-lobed or 5-toothed) Lactuceae
- aa. Sap rarely milky white; heads not liguliflorous, florets bisexual, unisexual, or neuter and corollas zygomorphic or actinomorphic, none truly ligulate (i.e., corolla limbs in bisexual florets not both laminar and 5-lobed or 5-toothed).
 - b. Corollas all zygomorphic, all bilabiate Mutisieae p. p.
 - bb. Corollas not all zygomorphic, not all bilabiate, some or all corollas actinomorphic.
 - c. Cypselae stalked-glandular Mutisieae p.p. (*Adenocaulon*)
 - cc. Cypselae not stalked-glandular.
 - d. Lobes of disc corollas mostly linear, lengths more than 3 times widths in most spp.; anthers ecalcarate (filament insertion distal to bases of anther sacs); styles with stigmatic surface continuous on adaxial face of each branch (stigmatic papillae not in 2 distinct or contiguous lines).
 - e. Leaves opposite; corollas yellow to orange Liabeae
 - ee. Leaves alternate; corollas white to cyanic, purple, or red [yellow].
 - f. Leaves and/or phyllaries prickly or spinose; anther bases caudate Cardueae
 - ff. Leaves and phyllaries neither prickly nor spinose (phyllaries sometimes pungent at tips); anther bases truncate to sagittate Vernonieae
 - dd. Lobes of disc corollas mostly deltate, lengths less than 3 times widths in most spp. (pistillate florets may lack corollas in some spp.); anthers ecalcarate in most spp.; styles with stigmatic surfaces in 2 separate lines on each branch in most spp., in 2 contiguous lines in some spp., continuous in some spp.
 - g. Anthers distinctly tailed.
 - h. Heads radiate; cypselae usually coiled, tuberculate; pappi none Calenduleae
 - hh. Heads discoid or disciform; cypselae not coiled or tuberculate; pappi none or of bristles.

- i. Stems and/or leaves usually strongly tomentose or lanate; phyllaries scarious or broadly scarious-margined Gnaphalieae
- ii. Stems and leaves not strongly tomentose or lanate; phyllaries herbaceous, not scarious or broadly scarious-margined Plucheeae
- gg. Anthers not tailed (sagittate in some spp.).
 - j. Heads discoid; corollas white or pinkish to purplish, never yellow; style-branch appendages terete to clavate, 2–3+ times longer than the stigmatic lines in most spp., shorter and ± flattened in few spp. Eupatorieae
 - jj. Heads radiate, discoid, disciform, or radiant; corollas of the disc florets yellow, orange, or brown in most spp., white or cyanic in very few spp.; style-branch appendages less than 2 times as long as stigmatic lines in most spp., longer in very few spp.
 - k. Phyllaries in 3–5 series and unequal in most spp., margins scarious in most spp.; style branches truncate, without appendages; pappi none or coroniform Anthemideae
 - kk. Phyllaries in 1–2 series and ± equal or in 3–5+ series and unequal, margins not scarious in most spp.; style branches usually conspicuously appendaged except in Senecioneae; pappi none or variously of scales and/or bristles and/or awns, coroniform in very few spp.
 - l. Phyllaries in 1–2 series and subequal in most spp., sometimes coherent, actually free to base or nearly so, involucre proper subtended by a calyculus of bractlets in some spp.; receptacles epaleate; cypselae columnar to fusiform or obovoid, not strongly compressed or obcompressed, in most spp.; pappi of 30–100+ fine bristles (never plumose) in most spp., pappi none in very few spp. Senecioneae
 - ll. Phyllaries subequal in 1–2 series or graduated in 3–5+ series, connate in some spp., involucre proper subtended by a calyculus in few spp. (see Heliantheae-Coreopsidinae and Heliantheae-Pectidinae); receptacles paleate or epaleate; cypselae various, often compressed or obcompressed; pappi none or of scales and/or bristles and/or awns.
 - m. Leaves all alternate in most spp., basal in some spp.; phyllaries graduated in 3–5+ series in most spp., subequal in very few spp., mostly linear to oblanceolate; receptacles epaleate; laminae of ray corollas becoming coiled like watch springs or butterfly probosci in most spp.; anthers connate; inner faces of style-branch appendages glabrous; pappi usually of bristles, seldom of scales, rarely none Astereae
 - mm. Leaves opposite (at least proximally) in most spp., alternate in some spp., basal in some spp.; phyllaries subequal in 1–3 series (then linear to lanceolate) or graduated in 3–5+ series (then lanceolate to ovate or broader); receptacles paleate or epaleate; laminae of ray corollas very rarely coiled; anthers connate or free; inner faces of style-branch appendages usually papillate to hispidulous; pappi usually of scales or awns, seldom of bristles, sometimes none Heliantheae

HELIANTHEAE S. L.

Heliantheae Cass., J. Phys. 88:189. 1819. — TYPE: *Helianthus* L.

Herbs, shrubs, vines, or trees; leaves usually all or mostly opposite, sometimes whorled, sometimes mostly alternate (then usually with 1–3+ pairs opposite) or mostly basal, blades mostly simple, sometimes pinnate or pinnately lobed or dissected, sometimes palmately divided; **capitulescences** mostly monocephalic, corymbiform, or paniculiform, sometimes with heads grouped in second-order heads; **involucre**s various, 2–35+ mm diam.; **phyllaries** subequal in 1–3 series (then usually linear to lanceolate) or graduated in 3–5+ series (then usually lanceolate to ovate or broader), usually wholly herbaceous, sometimes scarious or scarious-margined; **receptacles** flat to conical or columnar, paleate or epaleate, sometimes with setiform enations, rarely hairy; heads radiate, discoid, disciform, or radiant; **ray florets** usually 3, 5, 8, 13, or 21, sometimes none, pistillate and fertile, styliiferous and sterile, or neuter, corollas usually yellow to orange, sometimes

white, sometimes wholly or partially red or brown, rarely cyanic or purple, rarely coiled; **disc florets** bisexual or functionally staminate, corollas usually yellow to orange, sometimes red, brown, purple, or green, rarely ochroleucous or white, actinomorphic in most spp., often abruptly dilated at tube/throat interface, lobes (3–)5, lengths of lobes usually less than 3 times widths, rarely longer; anthers connate or free (Ambrosiinae), not tailed (sometimes sagittate), appendages usually deltate to ovate or lanceolate, broadly V-shaped in cross section; styles usually glabrous proximal to the bifurcation, the branches usually with stigmatic papillae in 2 lines, seldom continuous, the appendages usually narrowly triangular to subulate, sometimes shorter, usually papillate to hispidulous on both faces; **cypselae** usually prismatic, compressed, obcompressed, or flattened, seldom cylindric or terete, sometimes winged, lengths usually 1–3 times widths, sometimes longer; pappi usually wholly or partially of scales (the scales often aristate), sometimes of awns, sometimes partially, seldom wholly, of bristles, sometimes none.

My circumscription and subtribal taxonomy of Heliantheae s.l. closely follows that of Robinson (1981). I have treated 82 genera, 225 species, of Heliantheae as members of the flora of Chiapas.

Key to subtribes of Heliantheae s.l. found in Chiapas (adapted from Robinson, 1981).

- a. Heads all unisexual; pistillate florets without corollas; anthers free (filaments may be connate); pollination by wind; cypselae borne within prickly or spiny, burlike perigynia Ambrosiinae p.p.
- aa. Heads not all unisexual; pistillate florets usually bearing corollas; anthers usually connate (filaments usually free); pollination usually by insects; cypselae seldom enclosed within perigynia (the perigynia, if any, not very prickly or spiny, not burlike).
 - b. Receptacles wholly epaleate (sometimes with setiform enations in Gaillardiiinae).
 - c. Leaves and/or phyllaries dotted or streaked with pellucid glands containing strongly scented oils. Pectidinae
 - cc. Leaves and phyllaries not streaked or dotted with pellucid glands, or, if so, glands not with strongly scented oils.
 - d. Florets 1–5(–10) per head, the heads grouped in glomerules or in second-order heads.
 - e. Phyllaries connate ca. 5/6 of their lengths Helianthinae p.p. (37. *Lagascea*)
 - ce. Phyllaries free to their bases (some individual phyllaries saclike in Desmanthodiinae).
 - f. Herbs, mostly 1(–2) m tall; disc florets mostly bisexual; cypselae 8–10-ribbed, not enclosed in sac-like phyllaries Flaveriinae
 - ff. Mostly shrubs or trees 1–3+ m tall; disc florets functionally staminate; cypselae obscurely, if at all, ribbed, each enclosed within a saclike phyllary Desmanthodiinae
 - dd. Florets mostly 10–150+ per head, the heads not grouped in glomerules or in second-order heads.
 - g. Trees or shrubs; heads usually 50–300+ in each corymbiform capitulescence; fresh cypselae ± fleshy Clibadiinae
 - gg. Herbs or shrubs; heads usually fewer than 30 per capitulescence; cypselae never fleshy.
 - h. Disc corollas usually 4-lobed; cypselae strongly flattened, margins ciliate Peritylinae
 - hh. Disc corollas usually 5-lobed; cypselae clavate to obpyramidal, not both strongly flattened and ciliate.
 - i. Leaves in basal rosettes and/or cauline, alternate; corolla lobes usually shaggily villous with moniliform hairs; cypselae mostly stoutly obpyramidal, lengths 1–2 times diams Gaillardiiinae
 - ii. Leaves mostly cauline, all or at least the proximal opposite; lobes of disc corollas not shaggily villous with moniliform hairs; cypselae mostly narrowly clavate or obpyramidal, lengths mostly 2.5+ times diams. (except *Galeana* in Hymenopappinae).
 - j. Lobes of disc corollas about as long as wide; walls of cypselae not striate Hymenopappinae
 - jj. Lobes of disc corollas often 2+ times longer than wide; walls of cypselae striate Chaenactidinae
 - bb. Receptacles wholly or partially paleate.
 - k. Outer phyllaries usually herbaceous and linear, usually strongly contrasting with the more membranous, broader inner ones (except *Goldmanella*, which has strongly asymmetric leaf bases); paleae linear to ovate, ± flat, not navicular or conduplicate (except *Goldmanella*); all or some cypselae usually strongly ob-compressed or -flattened, or some or all cypselae quadrate and long-attenuate. Coreopsidinae

- kk. Outer phyllaries usually similar to inner ones; paleae usually conduplicate to navicular and each \pm infolding a subtended floret, sometimes linear, not infolding florets; cypselae usually terete, pyramidal, compressed, or flattened, rarely ob-compressed or -flattened (then, often triquetrous) sometimes abruptly rostrate, not long-attenuate.
- l. Disc florets functionally staminate (except *Rumfordia* in Milleriinae); disc corollas without fiber sheaths in their throats; pappi none.
 - m. Ray cypselae each shed together with a subtending phyllary and two adjacent paleae
 Ambrosiinae p.p. (47. *Parthenium*)
 - mm. Ray cypselae not each shed together with a subtending phyllary and 2 adjacent paleae.
 - n. Florets 1–5(–10) per head, the heads grouped in glomerules or in second-order heads
 Desmanthodiinae
 - nn. Florets mostly 10–150+ per head, the heads not grouped in glomerules or in second-order heads.
 - o. Trees or shrubs; heads usually 50–300+ in each \pm corymbiform capitulescence; fresh cypselae \pm fleshy Clibadiinae
 - oo. Herbs or shrubs; heads usually fewer than 50 per capitulescence; cypselae never fleshy.
 - p. Stems and peduncles often stipitate-glandular; limbs of ray corollas mostly flabellate, usually 3-lobed or -toothed Milleriinae
 - pp. Stems and peduncles mostly not stipitate-glandular (except in some *Smallanthus* spp.); limbs of ray corollas ovate to oblong, 2(–3)-toothed or -lobed
 Melampodiinae
- ll. Disc florets bisexual in most genera (except *Baltimora*, *Delilia*, *Rensonia*, and *Tragoceros*, all in Ecliptinae); disc corollas usually with fiber sheaths associated with veins in their throats (except: Neurolaeninae); pappi present or not.
 - q. Ray florets neuter, corollas usually white, rarely yellow; paleae becoming much enlarged and each loosely enclosing a cypselae in fruit; pappi none Montanoinae
 - qq. Ray florets pistillate, or styliferous and sterile, or neuter, corollas mostly yellow or orange, rarely white, pink, or purple; paleae seldom much enlarged in fruit (if enlarged, then each closely investing, and shed with, a cypselae); cypselae usually pappose, rarely epappose.
 - r. Ray florets usually present and neuter; throats of disc corollas usually basally thickened and \pm scabrellous; stigmatic surface of each style branch continuous or in 2, contiguous, indistinct lines; cypselae biconvex to compressed or flattened Helianthinae
 - rr. Ray florets usually present and pistillate, rarely neuter or styliferous and sterile; throats of disc corollas seldom much thickened or scabrid at their bases; stigmatic surface of each style branch usually in 2, distinct lines, rarely continuous; cypselae prismatic, or terete, or biconvex to flattened.
 - s. Receptacles usually conic to hemispheric; ray corollas (if any) mostly white or pink to purplish, sometimes yellow; cypselae striate Galinsoginae
 - ss. Receptacles mostly flat to convex, sometimes conic to hemispheric; ray corollas (if any) mostly yellow to orange, sometimes white or pinkish to purplish or red; cypselae not striate.
 - t. Corollas of disc florets without fiber sheaths, ducts usually with reddish resin; cypselae mostly obpyramidal, none winged; elements of pappi usually in radial arrangements Neurolaeninae
 - tt. Corollas of disc florets with fiber sheaths associated with veins, ducts usually with colorless resin; cypselae variously shaped, often \pm flattened, often winged; elements of pappi usually in bilateral arrangements, rarely radial. Ecliptinae

Ambrosiinae: Key to Chiapan genera

- a. Heads bisexual; cypselae not enclosed within burlike perigynia. 47. *Parthenium*
- aa. Heads unisexual; cypselae enclosed within burlike perigynia.
 - b. Outer phyllaries of staminate heads partially or wholly connate; receptacles of staminate heads flat or convex; burs mostly 2–5 mm long 6. *Ambrosia*
 - bb. Outer phyllaries of staminate heads free to their bases; receptacles of staminate heads conic; burs mostly 10–35 mm long 79. *Xanthium*

Chaenactidinae: Key to Chiapan genera

- a. Leaves sessile, undivided, entire; phyllaries unequal, 8–12 in 2–3+ series 21. *Espejoa*
- aa. Leaves petiolate, variously toothed or pedately or pinnately divided; phyllaries \pm equal, usually 5, 8, or 12 in 1(–2) series.
 - b. Leaves undivided or pedately divided into lanceolate to oblanceolate lobes; heads usually discoid. 23. *Florestina*
 - bb. Leaves usually 1–2-pinnately divided into linear to filiform lobes; heads usually with 1–2 (inconspicuous) ray florets, rarely discoid 61. *Schkuhria*

Clibadiinae: 12. *Clibadium* is the only Chiapan genus of Clibadiinae.**Coreopsidinae: Key to Chiapan genera**

- a. Vines with twining petioles 34. *Hidalgoa*
- aa. Not vines or, if viney (some *Bidens* spp.), then without twining petioles.
 - b. Cauline leaves all or mostly alternate.
 - c. Leaf bases symmetric 11. *Chrysanthellum*
 - cc. Leaf bases strongly asymmetric 28. *Goldmanella*
 - bb. Cauline leaves mostly opposite.
 - d. Shrubs; cypselae strongly obflattened, narrowly winged, epappose 14. *Coreopsis*
 - dd. Herbs or shrubs, sometimes viney (if at all woody, cypselae not much obflattened); cypselae either flattened or quadrate-attenuate (sometimes in the same head), usually not winged, pappose or not.
 - e. Stamen filaments hairy just proximal to anther collars; cypselae quadrate and fusiform, usually with 1 pronounced groove on each face, often distally attenuate 15. *Cosmos*
 - ee. Stamen filaments not hairy; cypselae various (if quadrate, with 2–4 grooves on each face).
 - f. Annuals; ray florets pistillate, fertile; ray corollas usually inconspicuous 33. *Heterosperma*
 - ff. Annuals or perennials; if annual: ray florets none, or neuter, or styliferous and sterile; ray corollas (if any) usually showy.
 - g. Roots often tuberous; inner phyllaries mostly 12–28 mm long; paleae lance-linear to broadly ovate, usually obscuring the cypselae; pappi none or rudimentary 16. *Dahlia*
 - gg. Roots seldom tuberous; inner phyllaries 4–8(–12) mm long; paleae linear, mostly shorter than, and narrower than, the inner cypselae; pappi rarely wanting, usually of 2–5+, retrorsely (rarely antorsely) barbed awns 8. *Bidens*

Desmanthodiinae: 18. *Desmanthodium* is the only Chiapan genus of Desmanthodiinae.**Ecliptinae: Key to Chiapan genera**

- a. Ray corollas lacking tubes or tubes very short (laminae sessile on the ovaries or nearly so), usually marcescent.
 - b. Ray cypselae ob-compressed or -flattened, 1-nerved on each face, margins \pm revolute; disc florets functionally staminate 72. *Tragoceros*
 - bb. Ray cypselae usually 3–4-angled, if obflattened, not 1-nerved on each face nor with revolute margins; disc florets bisexual, usually fertile.
 - c. Leaves decidedly petiolate, blades broadly deltate to trullate or lance-ovate, coarsely toothed or serrate; cypselae all stout, 3–4-angled.
 - d. Heads usually 3–7+ together; peduncles 1–8 cm long; paleae strongly carinate; pappi none or of 1–4 awns or subulate squamellae 51. *Philactis*
 - dd. Heads mostly borne singly; peduncles 8–15 cm long; paleae not carinate; pappi none 32. *Heliopsis*
 - cc. Leaves sessile or subsessile, blades narrowly deltate, entire; cypselae all, or at least the inner, flattened.
 - e. Paleae obtuse, usually erose to fimbriate at tips; ray cypselae obcompressed to weakly 3-angled, each bearing 0–2 awns; hairs of disc cypselae straight. 81. *Zinnia*
 - ee. Paleae rigidly subulate at tips; ray cypselae 3-angled, each bearing 3 stout awns; hairs of disc cypselae uncinata (seen at ca. 20 \times mag.) 59. *Sanvitalia*
 - aa. Ray florets none or ray corollas with distinct tubes and rarely, if ever, marcescent.
 - f. Pappi of 2–30, free, caducous or very fragile setae or stout, coarse bristles.
 - g. Corollas yellow 50. *Perymenium*
 - gg. Corollas whitish or purplish to blackish.
 - h. Heads radiate 55. *Rojasianthe*
 - hh. Heads discoid 42. *Melanthera*

- ff. Pappi none or of 2–10, free or connate, usually strongly persistent, erose, lacerate, or aristate squamellae or awns.
- i. Cypselae abruptly rostrate (i.e., each bearing a distinct neck or boss at the apex; rostra short in *Zyzyxia*, which has pinnately nerved, coriaceous leaves); pappi usually present, borne on the rostra, and cyathiform (i.e., each an erose, fimbriate, or lacerate cup or corona, with or without additional awns or bristles).
- j. Cypselae with well-developed carpodia, some or all cypselae in each head bearing elaiosomes at their bases.
- k. Leaf blades mostly coriaceous, pinnately nerved (with prominent or prominulous nerves on both faces); innermost phyllaries oblong to subrotund; cypselae very narrowly, if at all, winged, their rostra short, inconspicuous 82. *Zyzyxia*
- kk. Leaf blades mostly herbaceous, usually conspicuously triplinerved; innermost phyllaries lanceolate or deltate to oblong; usually some or all cypselae decidedly winged and/or with conspicuous rostra 78. *Wedelia*
- jj. Cypselae with poorly developed, inconspicuous carpodia, elaiosomes none.
- l. Plants mostly prostrate, rooting at the nodes. 66. *Sphagneticola*
- ll. Plants erect or twining, not rooting at the nodes.
- m. Herbs 7. *Baltimora*
- mm. Shrubs or lianas 80. *Zexmenia*
- ii. Cypselae not rostrate; pappi none or borne directly on summits of the cypselae, pappi not cyathiform.
- n. Cypselae usually winged, some or all cypselae in a head each bearing 1 or 2 wings (wider than thick) of membranous or corky tissue different from that of the walls of the bodies of the cypselae (sometimes only the ray cypselae winged).
- o. Wings of ray cypselae usually lacerate; disc cypselae none or not winged.
- p. Shrubs or trees, to 5 m high; heads pedunculate in corymbiform to paniculiform capitulescences 54. *Rensonia*
- pp. Herbs, mostly 3–5 dm high; heads mostly sessile or nearly so, scattered in axils along the stems 68. *Synedrella*
- oo. Wings of ray cypselae not lacerate; disc cypselae usually winged.
- q. Paleae \pm connate, at least proximally (best seen in fruiting heads) 40. *Lundellianthus*
- qq. Paleae free to their bases.
- r. Cypselae asymmetrically winged; awns of pappi 1 or 2, usually unequal . . . 46. *Otopappus*
- rr. Cypselae \pm symmetrically winged; awns of pappi usually 2, usually equal . . . 75. *Verbesina*
- nn. Cypselae not winged (each margin or angle of a cypselae body may be drawn to a fine edge, but edges not winged with distinct tissues), sometimes the margins or angles callous-thickened.
- s. Phyllaries 2–4 (1 rotund, the others lanceolate to linear); disc florets functionally staminate 17. *Delilia*
- ss. Phyllaries 4–30+, all \pm alike; disc florets bisexual.
- t. Cypselae quadrate to plumply biconvex in cross section (to flattened in *Flourensia*); shoulders of the cypselae not connate; pappus bristles or awns not continuous with the margins of the cypselae.
- u. Leaves alternate 24. *Flourensia*
- uu. Leaves opposite.
- v. Paleae linear-filiform; cypselae compressed, quadrate or triquetrous in cross section, obovate to cuneate in outline, lengths mostly 1.5–2 times widths. 20. *Eclipta*
- vv. Paleae conduplicate; cypselae flattened-clavate or narrowly prismatic, lengths mostly 2–5 times widths.
- w. Receptacles \pm flat; cypselae prismatic, 4–5-angled. 77. *Wamalchitamia*
- ww. Receptacles strongly convex to conical or hemispheric; cypselae flattened or biconvex.
- x. Phyllaries erect through anthesis; discs cylindric through anthesis; ray corollas yellow 67. *Squamopappus*
- xx. Phyllaries soon reflexed; discs globose in anthesis and fruit; ray corollas white. 52. *Podachaenium*
- tt. Cypselae (at least those of the disc) strongly compressed or flattened; shoulders of the cypselae \pm connate; pappus bristles or awns \pm continuous with the margins or angles of the cypselae bodies.
- y. Annuals or weak-stemmed perennials, often rooting at the nodes; heads mostly scattered and borne singly.

- z. Phyllaries 6–16 in 2–3 series; receptacles conical; pappi none or of 2(–3), fragile, pliant bristles. 1. *Acmella*
- zz. Phyllaries 4–6 in 1 series; receptacles flat to convex; pappi of 2(–5), persistent, stiff awns 10. *Calyptocarpus*
- yy. Trees, shrubs, lianas, or coarse, sometimes tuberous-rooted, perennial herbs; heads usually 5–25(–90) together in umbelliform clusters or paniculiform masses.
 - a'. Heads discoid 58. *Salmea*
 - aa'. Heads radiate.
 - b'. Phyllaries erect through anthesis; ray corollas yellow to orange 38. *Lasianthaea*
 - bb'. Phyllaries soon reflexed; ray corollas white 52. *Podachaenium*

Flaveriinae: 22. *Flaveria* is the only Chiapan genus of Flaveriinae.

Galinsoginae: Key to Chiapan genera

- a. Heads clearly grouped in capitulescences of 8–50+ heads in ± crowded, corymbiform associations; peduncles mostly 2–12(–25) mm long.
 - b. Pappi none or of 1–3 or 10–20, spatulate to lance-subulate squamellae 5. *Alloispermum*
 - bb. Pappi of 25–35, fine, fragile bristles 60. *Schistocarpha*
- aa. Heads borne singly or loosely associated; peduncles mostly (1–)3–20 cm long.
 - c. Pappi of 10, 20, or 40, ciliate to plumose, ± subulate squamellae 73. *Tridax*
 - cc. Pappi none, or of 6–20, erose to lacerate (not ciliate to plumose), lanceolate to spatulate squamellae, or of 8–10 barbellate setae.
 - d. Ray corollas yellow to orange (sometimes marked with purple), usually inconspicuous; pappi none 36. *Jaegeria*
 - dd. Ray corollas white to pinkish or purplish, usually showy; pappi usually present.
 - e. Perennials (sometimes flowering first year), often decumbent, often rooting at proximal nodes 57. *Sabazia*
 - ee. Annuals (rarely persisting), usually erect, not known to root at nodes.
 - f. Pappi caducous or very fragile, of 8–10, barbellate setae 4. *Alepidocline*
 - ff. Pappi persistent, of 8–20, erose, fimbriate, or lacerate, spatulate to lanceolate squamellae 27. *Galinsoga*

Gaillardinae: Key to Chiapan genera

- a. Receptacles usually with setiform enations; style branches usually attenuate 25. *Gaillardia*
- aa. Receptacles usually lacking setiform enations; style branches usually truncate 30. *Helenium*

Helianthinae: Key to Chiapan genera

- a. Individual heads each bearing 1 (rarely 2–8) floret, the true heads aggregated into second-order “heads” of 8–55 heads; phyllaries 4–6(–11), connate ca. 5/6 of their lengths 37. *Lagascea*
- aa. Individual heads usually bearing 10–150+ florets, the heads not aggregated into second-order heads; phyllaries (5–)9–30+, free to their bases or nearly so.
 - b. Disc florets each completely surrounded by a palea; cypselae shed within and together with perigynia formed by the paleae.
 - c. Leaf blades abaxially resinous-gland-dotted; phyllaries usually with blackish nerves or mottlings; tubes of disc corollas 10-nerved, ca. 1/2 as long as the throats 3. *Aldama*
 - cc. Leaf blades not abaxially resinous-gland-dotted; phyllaries usually green, usually without darker nerves or mottlings; tubes of disc corollas 5-nerved, ca. 1/8 as long as the throats 62. *Sclerocarpus*
 - bb. Disc florets not each completely surrounded by a palea; cypselae not borne within perigynia.
 - d. Leaves mostly basal, the cauline all alternate 35. *Iostephane*
 - dd. Leaves mostly cauline, all or the proximal opposite.
 - e. Nodes and/or bases of petioles usually auriculate; cypselae strongly flattened; pappi usually of 2, fragile or caducous awns (rarely with 1–12, additional, erose squamellae), pappi rarely none 64. *Simsia*

- ee. Neither nodes nor petiole bases auriculate; cypselae somewhat compressed or flattened, usually decidedly biconvex; pappi usually of 2, persistent, aristate squamellae plus 1–4, shorter, erose squamellae, pappi sometimes none.
- f. Peduncles usually strongly dilated and fistulose distally; paleae (6–)9–17 mm long; laminae of ray corollas (15–)25–70 mm long 71. *Tithonia*
- ff. Peduncles neither much dilated nor fistulose; paleae 2–8(–12) mm long; laminae of ray corollas 4–25(–35) mm long.
 - g. Leaf blades with a single primary nerve; phyllaries 12–26 in 2(–3) series, mostly subequal, uniformly herbaceous; pappi none 31. *Helioeris*
 - gg. Leaf blades usually with 3 or 5 principal nerves from near their bases; phyllaries 12–24(–30+) in 2–7 series, usually strongly graduate, sometimes subequal, the outer usually ribbed, carinate, or basally indurate; pappi none or of 1–2, aristate squamellae plus 1–5, shorter, erose squamellae 76. *Viguiera*

Hymenopappinae: Key to Chiapan genera

- a. Herbs; heads radiate (ray cypselae cucullate-winged); pappi none 26. *Galeana*
- aa. Shrubs; heads discoid (no cypselae winged); pappi of squamellae, the abaxial shorter than the adaxial 39. *Loxothysanus*

Melampodiinae: Key to Chiapan genera

- a. Shrubs or coarse herbs, 1–12 m high; outer phyllaries (3–)9–25 mm long; inner phyllaries ± infolding subtended cypselae but not forming perigynia; paleae persisting or falling singly 65. *Smallanthus*
- aa. Herbs or suffrutices, mostly less than 1 m high (except *M. perfoliatum*); outer phyllaries 3–7(–20) mm long; inner phyllaries closely investing the cypselae, each forming a “perigynium” and shed with the invested cypselae; paleae usually falling together as a mass with the spent disc florets 41. *Melampodium*

Milleriinae: Key to Chiapan genera

- a. Outer phyllaries 2–3; ray florets 1, disc florets 3–5(–8), per head 43. *Milleria*
- aa. Outer phyllaries usually 5; ray florets 4–20, disc florets 10–80+, per head.
 - b. Peduncles straight, not recurved; outer phyllaries mostly lance-ovate to rotund, their lengths mostly 1–3 times their widths 56. *Rumfordia*
 - bb. Peduncles usually recurved distally, crozier-like; outer phyllaries mostly lanceolate to linear, their lengths mostly more than 3 times their widths.
 - c. Outer phyllaries usually strongly reflexed; tubes of disc corollas 0.8–2 times as long as the abruptly dilated throats; cypselae mostly ± 4-angled 63. *Sigesbeckia*
 - cc. Outer phyllaries erect; tubes of disc corollas mostly less than half as long as the gradually dilated throats; cypselae mostly 3-angled 74. *Trigonospermum*

Montanoinae: 44. *Montanoa* is the only genus of Montanoinae.

Neurolaeninae: Key to Chiapan genera

- a. Phyllaries mostly 20–40; pappi of bristles 45. *Neurolaena*
- aa. Phyllaries mostly 12–16(–24); pappi of squamellae.
 - b. Pappi of 3–4, spatulate to subulate squamellae plus 0–8, shorter, erose to lacerate squamellae 70. *Tetrachyron*
 - bb. Pappi of 8–25, ± similar, subequal squamellae 9. *Calea*

Pectidinae: Key to Chiapan genera

- a. Leaf blades all simple, sessile, narrow, and bristly-setose at their bases; ray florets borne on bases of the subtending phyllaries 48. *Pectis*
- aa. Leaf blades not simple and sessile and narrow and bristly-setose at their bases; ray florets none or borne on receptacles.
 - b. Phyllaries free to their bases.
 - c. Phyllaries in 1 series; ray florets none; pappi of 25–50+ bristles, all free to their bases 53. *Porophyllum*

- cc. Phyllaries in 2 series; ray florets rarely wanting, usually 1–15; pappi of 15–20, free squamellae, each squamella comprising 5–10, basally connate bristles.
- d. Leaf blades simple or trifoliate, glands mostly in rows between the lateral veins; lobes of disc corollas lance-linear 13. *Comaclinium*
- dd. Leaf blades pinnatifid with 3–17, oblanceolate, lance-cuneate, or linear lobes, glands scattered and/or submarginal; lobes of disc corollas deltate 19. *Dyssodia*
- bb. Phyllaries connate 1/2 or more of their lengths.
- e. Pappi of 10 or fewer, simple squamellae, 0–5 of the squamellae lance-subulate to uniaristate, the others erose, some or all connate 69. *Tagetes*
- ee. Pappi of 15–20 squamellae, some or all of the squamellae each comprising 3–7, basally connate bristles.
- f. Leaf blades not divided; phyllaries 5–13, connate their whole lengths or nearly so . . . 29. *Gymnolaena*
- ff. Leaf blades pinnate or pinnatifid; phyllaries 12–22, connate ca. 1/2 of their lengths (margins of the outer phyllaries may be free nearly to their bases). 2. *Adenophyllum*

Peritylinae: 49. *Perityle* is the only Chiapan genus of Peritylinae.

1. ACMELLA

Acmella Rich. in C. H. Persoon, Syn. pl. 2:472. 1807. — *Spilanthes* Jacq. sect. *Acmella* (Rich.) DC., Prodr. 5:620. 1836. — LECTOTYPE (Jansen 1985, p. 19): *Acmella repens* (Walt.) Rich. ≡ *Anthemis repens* Walt.
Colobogyne Gagnep., Not. Syst. (Paris) 4:15. 1920. — TYPE: *Colobogyne langbianensis* Gagnep. = *Acmella calva* (DC.) R. K. Jansen.

Annual or perennial herbs, erect or repent to decumbent or ascending, stems 1–5(–15) dm long, often rooting at proximal nodes; leaves opposite, sometimes basally crowded, petioles often winged, at least distally, blades mostly ovate to rhombic, sometimes lance-linear to filiform, 3-nerved from near their bases, margins entire or serrate to crenate, the faces glabrous or variously pilose, strigose, or tomentose; heads borne singly or loosely associated, peduncles mostly 3–10(–20+) cm long; involucre broadly conic to hemispheric in early anthesis, becoming saucer-shaped, mostly 4–12 mm diam.; phyllaries mostly 8–15(–20+) in 2(1–3) subequal series, herbaceous to membranous, ovate to linear; receptacles narrowly conic to fusiform, length ultimately 3–5 times diam.; paleae stramineous, sometimes distally purplish or yellowish, membranous to scarious, navicular to conduplicate, apically rounded and erose to acuminate and entire; ray florets none or, mostly, 5–15(–20+), pistillate, fertile, corollas white to ochroleucous, yellow, or orange, tubes stout, often pilosulous, laminae linear to oblong or obovate, sometimes very short or wanting; disc florets 100–200(25–300+), bisexual, fertile, corollas white to ochroleucous, yellow, or orange, mostly glabrous, tubes stout, much shorter than the cylindro-funnelform or campanulate throats, mouth often strongly oblique, lobes 4–5, deltate; anthers 4–5, yellowish to brown or black; style branches slender, truncate, papillate; cypselae blackish, often with whitish, translucent outer layer, laterally flattened or triquetrous (the peripheral), narrowly obovate to elliptic in outline, obliquely inserted, faces glabrous or distally piloso-hispidulous or warty, margins calloused or not, eciliate or with ascending to patent, white to tawny hairs to 0.6 mm long; pappi none or of 2(–3, sometimes more), fragile bristles shorter than the cypselae; $x = 12, 13$.

Some 25–30 species, apparently American in origin, now nearly pantropical and in subtropical areas.

REFERENCE: JANSEN, R. K. 1985. The systematics of *Acmella* (Asteraceae-Heliantheae). Syst. Bot. Monogr. 8:1–115.

- a. Repent to decumbent (rarely erect) perennials, commonly rooting at proximal nodes; heads mostly borne singly, usually held well beyond the leaves, peduncles mostly 7–15(3–20+) cm long; cypselae not connate on shoulders, usually eciliate or with marginal hairs less than 0.4 mm long, seldom pappose 3. *A. repens*
- aa. Erect annuals, seldom rooting at nodes; heads often loosely associated (seldom held much beyond the leaves), peduncles mostly 2–7(–15) cm long; cypselae connate on the 2(–3) shoulders, ciliate with hairs 0.3–0.6 mm long, pappi none or of 2–3, fragile bristles.
- b. Heads discoid [disciform]; corollas greenish to ochroleucous 2. *A. radicans*
- bb. Heads radiate; corollas ochroleucous to yellow. 1. *A. brachyglossa*

- 1. ***Acmella brachyglossa* Cass. in F. Cuvier, Dict. sci. nat., ed. 2. 50: 258. 1827.**

— TYPE: French Guiana, 1819–1821, *M. Poiteau s.n.* (P; isotype: G).

Spilanthes caespitosa DC., Prodr. 5:620. 1836. — *Ceratocephalus caespitosus* (DC.) Kuntze, Revis. gen. pl. 1:326.

1891. — TYPE: Brazil, Minas Gerais, Marianne, 1833, *M. Vauthier* 308 (G-DC; isotypes: G, GH).
Spilanthes arrayana Gardn., London J. Bot. :408. 1848. — TYPE: Brazil, Goiás, Arrayas, Mar 1840, *G. Gardner* 3866 (BM; isotypes: CGE, E, F, G, K, NY, P, W).
Spilanthes eggersii Hieron., Bot. Jahrb. Syst. 28:608. 1901. — TYPE: Ecuador, Manabí, near Hacienda El Recreo, 4 Aug 1893, *H. Eggers* 14931 (B, destroyed; isotypes: K, W).
Spilanthes limonica A. H. Moore, Proc. Amer. Acad. Arts 42:541. 1907. — TYPE: Cuba, Las Villas, Colonia Limones, Ingenio Soledad near Cienfuegos, 26 Jan 1903, *C. G. Pringle* 75 (GH; isotypes: BAF, F, G, MEL, MEXU, MO, NY, PH, US).
Spilanthes ocyimifolia (Lam.) A. H. Moore f. *radiifera* A. H. Moore, Proc. Amer. Acad. Arts 42:533. 1907. — TYPE: Colombia, Magdalena, Santa Marta, Nov 1898–1901, *H. H. Smith* 513 (NY; isotypes: BM, BR, E, F, G, GH, LE, LL, MO, MPU, PH, RSA, S, TEX, U, USF, W).
 ILLUSTRATION: none found.

Erect annuals (seldom persisting), to 8(–15) dm high; petioles 7–25(–35) mm long, narrowly winged, at least distally, leaf blades lance-ovate to lanceolate, 4–8(–12) cm long, 2–4(–6) cm wide, bases broadly to narrowly cuneate, margins subentire to coarsely serrate or crenate, apices acute to somewhat acuminate, surfaces glabrous or nearly so; heads borne singly or loosely grouped; peduncles terminal and axillary, 3–7(2–15) cm long, glabrous or nearly so; involucre broadly funnellform to saucer-shaped; phyllaries 6–12, obscurely biseriate, greenish, herbaceous, lance-linear to ovate, 3–5 mm long, obscurely to prominently 3–5-nerved, glabrous or sparsely pilosulous; receptacles narrowly conic to fusiform, ultimately 3–7+ mm long; paleae hyaline, distally stramineous, obscurely nerved, 3–4 mm long, apically obtuse or rounded, erose; ray florets 5–8, corollas yellow or ochroleucous, tubes ca. 1 mm long, pilosulous, laminae oblong to ovate, 2–5 mm long; disc florets 100–200, corollas ochroleucous to yellow, tubes cylindric, ca. 0.4 mm long, throats ca. 0.8 mm long, lobes 4–5, ca. 0.3 mm long; anthers blackish; style branches ca. 0.4 mm long; cypselae blackish, often somewhat glaucous, laterally flattened or triquetrous (ray), oblong to obovate in outline, 1.8–2.3 mm long, 2(–3)-cornute, faces glabrous or distally sparsely piloso-hispidulous, margins densely ciliate with straight, ascending to patent, white hairs 0.3–0.5 mm long; pappi none or of 2(–3), fragile bristles 0.5–1.5 mm long; $2n = 78$; flowering Dec–Feb.

In moist, disturbed habitats in Lower Montane Rain and Pine-Oak forests; rare in Northern Highlands and on Central Plateau; 900–1300 m. Southern Mex. (Chis.), Guat., C.R., Pan., Antill.; S.A. (Col., Ven., Guy., Sur., Fr. Gui., Ecu., Peru., Bol., Braz., Parag.). CHIAPAS COLLECTIONS: *T* 2030 (DS); *TW* 2381 (CAS, TEX); 31254.

The type of *Acmella brachyglossa* may prove to be conspecific with that of *A. radicans*.

2. *Acmella radicans* (Jacq.) R. K. Jansen, Syst. Bot. Monogr. 8:69. 1985.

- *Spilanthes radicans* Jacq., Collectanea 3:229. 1789 [1791]. — [*Spilanthes exasperata* Jacq., Icon. pl. rar. 3(9):15, t. 584. 1792, nom. superfl. — *Ceratocephalus exasperatus* (Jacq.) Kuntze, Revis. gen. pl. 1:326. 1891.]

- TYPE: Venezuela, specimens unknown; use of this name here is based on the cited plate 584 in Icon. pl. rar.
Spilanthes debilis Kunth, Nov. gen. sp., ed. fol. 4:165. 1820 [1818]; ed. qto. 4:210. 1820. — *Acmella debilis* (Kunth) Cass. in F. Cuvier, Dict. sci. nat., ed. 2. 24:331. 1822. — *Ceratocephalus debilis* (Kunth) Kuntze, Rev. gen. pl. 1:326. 1891. — *Acmella radicans* (Jacq.) R. K. Jansen var. *debilis* (Kunth) R. K. Jansen, Syst. Bot. Monogr. 8:72. 1985. — TYPE: Venezuela, Orinoco River, May 1800, *A. J. A. Bonpland* s.n. (P, microfiche!).
Spilanthes tenella Kunth, Nov. gen. sp., ed. fol. 4:165. 1820 [1818]; ed. qto. 4:210. 1820. — *Acmella tenella* (Kunth) Cass. in F. Cuvier, Dict. sci. nat., ed. 2. 24:329. 1822. — *Ceratocephalus tenellus* (Kunth) Kuntze, Revis. gen. pl. 1:326. 1891. — TYPE: Venezuela, Caracas, Nov 1799, *A. J. A. Bonpland* s.n. (P, microfiche!).
Spilanthes exasperata Jacq. var. *cayennensis* DC., Prodr. 5:626. 1836. — TYPE: French Guiana, Cayenne, *J. Pairis* s.n. (G-DC, microfiche!).
Spilanthes mandonii Schultz-Bip., Linnaea 34:529. 1866. — TYPE: Bolivia, La Paz, Lanecaja, vicinity of Sorata near Espada, Apr–Jun 1860, *G. Mandon* 63 (B, destroyed; isotypes: BM, G, GH, MICH, MO, NY, MPU, P, S, US, W).
Spilanthes leucophaea Schultz-Bip. ex Klatt, Leopoldina 23:144. 1887. — TYPE: Mexico, Sinaloa, Culiacán, *J. G. Schaffner* s.n. (GH).
Spilanthes botteri S. Watson, Proc. Amer. Acad. Arts 26:141. 1891. — LECTOTYPE (Jansen 1985:70): Mexico, Jalisco, near Guadalajara, 18 Nov 1899, *C. G. Pringle* 2946 (GH; isolectotypes: F, NY).
Spilanthes ocyimifolia (Lam.) A. H. Moore var. *acutiserrata* A. H. Moore, Proc. Amer. Acad. Arts 42:533. 1907. — TYPE: Costa Rica, Cartago, Dec 1887, *J. Cooper* 5807 (US; isotypes: F, GH, K, US).
Sanvitalia longepedunculata M. E. Jones, Contr. W. Bot. 18:78. 1933. — LECTOTYPE (S. F. Blake 1945, Contr. U.S. Natl. Herb. 29:132): Mexico, Jalisco, La Barranca, Guadalajara, 19 Nov 1930, *M. E. Jones* 27761 (POM; isolectotype: POM).
 ILLUSTRATIONS: Fig. 1; Jacquin, Icon. pl. rar. 3(9):15, t. 584. 1792.

Erect annuals (seldom persisting?), 3–7(1–10) dm high, rarely somewhat decumbent and rooting along stems proximally; petioles 10–15(5–45) mm long, narrowly winged and/or ciliate distally, leaf blades broadly rhombo-ovate to lance-ovate, 5–7(3–10) cm long, 2–4(1–7) cm wide, bases broadly to narrowly cuneate, margins remotely crenate or entire, apices acute to obtuse, faces glabrous or sparsely strigillose; heads loosely grouped, seldom much surpassing the leaves; peduncles terminal and axillary, mostly 2–4(–6) cm long, glabrous or piloso-strigillose; involucre conic-turbinate to saucer-shaped; phyllaries 8–12, lance-ovate to lance-linear, 3–6 mm long, basally pale green to stramineous and somewhat cartilaginous, distally greener and more herbaceous, obscurely 3–5-nerved, glabrous or sparsely pilosulous, often ciliate; receptacles narrowly conic to fusiform, 3–5+ mm high; paleae greenish-stramineous to hyaline with 3(–5) pale to orange nerves, sometimes purplish distally, 3.5–5 mm long, apically obtuse or rounded, somewhat erose and often cuspidate, glabrous or abaxially dotted with resin globules or glandular hairs; ray

florets none; disc florets mostly 100–200 [the outermost sometimes functionally pistillate], corollas greenish to ochroleucous, 1.5–2 mm long, tubes ca. 0.5 mm long, basally dilated, throats narrowly funnelliform, ca. 1 mm long, lobes 4–5, ca. 0.5 mm long; anthers blackish; style branches ca. 0.5 mm long; cypselae blackish, laterally flattened or triquetrous (the peripheral), narrowly obovate in outline, 2–2.8 mm long, obliquely inserted, distally 2(–3)-cornute, faces glabrous or distally sparsely piloso-hispidulous, margins often calloused, densely ciliolate with straight, ascending or patent, white or tawny hairs 0.4–0.6 mm long; pappi none or of 2(–3), fragile bristles 0.5–1+ mm long; $2n = 78$; flowering mostly Oct.

Often in damp places in Montane Rain, Evergreen Seasonal, Tropical Deciduous, and Pine-Oak-Liquidambar forests and Short-tree Savanna; scattered on south side of Central Depression and in adjacent Sierra Madre, in Northern Highlands, and on Central Plateau; 700–1500 m. Mex. (Sin., Dgo., Nay., Jal., Cma., Mich., Méx., Mlos., Ver., Gro., Oax.), through C.A. and Antill. to S.A. (Col., Ven. to Bol., fide Jansen); adventive in India. CHIAPAS COLLECTIONS: *La 2899* (DS); *EM 728* (LL); *EM 6036* (CAS, LL); *EM 16180* (LL); *Nee 32333* (TEX); *Prat 1087* (TEX); *Prat 1092* (CAS); *SI 2363* (TEX); *Sund 2400* (TEX); *W&R 235* (TEX); *7727*; *13714*; *20565*; *21300*; *30206*; *38383*; *40548*; *46108*; *53826*.

3. *Acmella repens* (Walter) Rich. in C. H. Persoon, Syn. pl. 2:473. 1807.

— *Anthemis repens* Walter, Fl. carol. 211. 1788. — *Spilanthes repens* (Walter) Michx., Fl. bor.-amer. 2:131. 1803. — *Ceratocephalus repens* (Walter) Kuntze, Rev. gen. pl. 1:326. 1891. — *Spilanthes americana* (Mutis ex L. f.) Hieron. var. *repens* (Walter) A. H. Moore, Proc. Amer. Acad. Arts 42:547. 1907. — *Acmella oppositifolia* (Lam.) R. K. Jansen var. *repens* (Walter) R. K. Jansen, Syst. Bot. Monogr. 8:34. 1985. — NEOTYPE (Jansen 1985, p. 34): U.S.A., Texas, Chambers Co., 0.5 mile [800 m] W of exit 812 (junction Texas 61 on rd to Hankamer) along I-10E, 10 Jun 1979, R. K. Jansen and N. Harriman 665 (OS; isoneotypes: F, MO, NY, OSH, TEX, US).

Acmella occidentalis Nutt., Gen. N. Amer. pl. 2:171. 1818, non *Acmella occidentalis* (Willd.) Rich. in C. H. Persoon, 1807.

— *Acmella nuttalliana* Raf., New Fl. 1:52. 1836. — *Spilanthes nuttallii* Torr. & A. Gray, Fl. N. Amer. 2:356. 1842. — TYPE: Louisiana, New Orleans, *T. Nuttall* s.n. (BM; isotype: PH).

Spilanthes beccabunga DC., Prodr. 5:622. 1836. — [*Spilanthes beccabunga* M. Gómez, Anales Soc. Esp. Hist. Nat. 19:275. 1890, orthogr. var.] — *Ceratocephalus beccabunga* (DC.) Kuntze, Revis. gen. pl. 1:326. 1891. — LECTOTYPE (Jansen 1985:31): Mexico, valley of México, 31 Aug 1827, J. L. Berlandier 720 (G-DC; isoelectotypes: BM, G, LE, OXF, W).

Spilanthes subhirsuta DC., Prodr. 5:622. 1836. — *Ceratocephalus subhirsutus* (DC.) Kuntze, Revis. gen. pl. 1:326. 1891. — TYPE: Mexico, Tamaulipas, Tampico, 14 Feb 1827, J. L. Berlandier 149 (G-DC; isotypes: F, G, GH, P).

Spilanthes diffusa Poepp., Nov. gen. sp. pl. 3:50. 1843. — *Ceratocephalus diffusus* (Poepp.) Kuntze, Revis. gen. pl. 1:326. 1891. — *Spilanthes ciliata* Kunth var. *diffusa* (Poepp.) A. H. Moore, Proc. Amer. Acad. Arts 42:539.

1907. — TYPE: Peru, near Cuchero, 1830, E. F. Poeppig 1202 (W; isotype: W).

Spilanthes orizabaensis Schultz-Bip., Leopoldina 23:145. 1887. — LECTOTYPE (Jansen 1985, p. 31): Mexico, Veracruz, Mirador, *C. Sartorius* s.n. (GH; isoelectotypes: GH, MEL).

Spilanthes beccabunga DC. var. *parvula* B. L. Rob., Proc. Amer. Acad. Arts 27:176. 1892. — *Spilanthes americana* (Mutis ex L. f.) Hieron. var. *parvula* (B. L. Rob.) A. H. Moore, Proc. Amer. Acad. Arts 42:546. 1907. — TYPE: Mexico, México, Flor de María, 31 Aug 1890, C. G. Pringle 3643 (GH (missing?); isotype: MEXU).

Spilanthes disciformis B. L. Rob., Proc. Amer. Acad. Arts 27:176. 1893. — TYPE: Mexico, Jalisco, near Guadalajara, 17 Mar 1890, C. G. Pringle 3489 (GH; isotype: F).

Spilanthes lateralfiflora Klatt, Bot. Jahrb. Syst. 8:176. 1893. — TYPE: Guatemala, Alta Verapaz, near Cobán, 21 Apr 1882, F. C. Lehmann 1319 (GH; isotypes: G, K, US).

Spilanthes lehmanniana Klatt, Bot. Jahrb. Syst. 8:43. 1893. — TYPE: Colombia, Cauca, near Parce, 2 Mar 1884, F. C. Lehmann 3487 (GH; isotypes: G, K, US).

Spilanthes disciformis B. L. Rob. var. *phaneractis* Greenm., Proc. Amer. Acad. Arts 39:108. 1903. — *Spilanthes phaneractis* (Greenm.) A. H. Moore, Proc. Amer. Acad. Arts 42:543. 1907. — LECTOTYPE (Jansen 1985:32): Mexico, Michoacán, Zamora, 24 Jul 1882, C. G. Pringle 8637 (GH; isoelectotypes: BM, C, E, F, G, GOET, H, HBG, K, L, LE, M, MEXU, MICH, MO, MSC, NY, P, POM, S, US).

Spilanthes americana (Mutis ex L. f.) Hieron. f. *lanitecta* A. H. Moore, Proc. Amer. Acad. Arts 42:547. 1907. — TYPE: Guatemala, Quiché, San Siguan, Apr 1892, E. T. Heyde and E. Lux 3381 (GH; isotypes: F, G, M, US).

Spilanthes cocuyensis Cuatrec., Revista Acad. Colomb. Ci. Exact. 9: 247. 1954. — TYPE: Colombia, Boyacá, valley of Cocuy, 8 Sep 1938, J. Cuatrecasas 1254 (F).

ILLUSTRATION: Ann. Missouri Bot. Gard. 62:1141. 1975; as *Spilanthes oppositifolia* (Lam.) D'Arcy.

Repent, decumbent, or, exceptionally, erect perennials (often flowering first year), stems 1–3(–5?) dm long, often rooting at proximal nodes, glabrous or strigillose to pilose; petioles 3–8(–30) mm long, narrowly winged, often ciliolate, leaf blades lance-ovate to ovate, 2–4(–9) cm long, 1–3(–5) cm wide, [exceptionally lance-linear, 3–5 mm wide], bases rounded to cuneate, margins entire or remotely serrate to dentate-crenate, apices obtuse to acute, faces nearly glabrous to rather densely piloso-strigillose; heads mostly borne singly, held beyond leaves or not; peduncles terminal and in distal axils, 7–15(3–20+) cm long, glabrous or strigillose to pilose; involucre broadly conic to hemispheric, becoming saucer-shaped; phyllaries mostly 10–13, broadly ovate to lance-linear, 2.5–4(–6) mm long, green or purplish, cartilaginous to herbaceous, obscurely nerved, the inner paler, more membranous, all glabrous or variously piloso-strigillose to appressed-strigillose, often ciliolate; receptacles narrowly conic, 3–6+ mm high; paleae stramineous to hyaline, often with 1–3 darker nerves, often golden distally, navicular, 2.5–4 mm long, apically obtuse or rounded, somewhat erose, glabrous or sparsely pilosulous, often abaxially dotted with resin globules; ray florets mostly 8–16, corollas orange to yellow, often pale when dry, sometimes with darker nerves, tubes cylindro-funnelform, 1–1.5 mm

long, piloso-hispidulous, laminae broadly to narrowly oblong, obovate, or quadrate, 5–6(3–7+) mm long; disc florets mostly 100–200+, corollas ochroleucous with yellow to orange limbs, 1.5–2.5 mm long, tubes cylindric, 0.3–0.6 mm long, basally dilated and thickened, throats narrowly funnelliform to campanulate, 1–1.5 mm long, lobes 4–5, 0.3–0.5 mm long; anthers yellow, brown, or black; style branches 0.5–0.8 mm long; cypselae blackish, often with tawny or translucent outer layer, laterally flattened or triquetrous (rays), narrowly, often obliquely, obovate to oblanceolate in outline, 1.3–2.5 mm long, distally rounded or truncate, not cornute, faces glabrous or strigosohispidulous and, often, warty, margins weakly, if at all, callosed, bare or ciliate with hairs to 0.4 mm long; pappi usually none, sometimes of 1(–3), fine, fragile bristles to 1.2 mm long; $2n = 26, 52, 78$; flowering mostly Sep–Feb.

Usually in damp or wet, disturbed places in Tropical Rain, Lower Montane Rain, Montane Rain, Evergreen Cloud, Tropical Deciduous, Pine-Oak-*Liquidambar*, and Pine-Oak forests; scattered in Northern Highlands, in Eastern Highlands, and on Central Plateau, also in Central Depression and Sierra Madre; 1200–2200(300–2750) m. Mex. (Tam., S.L.P., Nay., Jal., Hgo.,

Cma., Mich., Méx., D.F., Mlos., Pue., Ver., Oax., Tab.), Guat., Hond., C. R., Pan.; Antill. (Cuba); S.A. (Col., Ven., Ecu., Peru, Bol., Parag.) CHIAPAS COLLECTIONS: *Br* 643 (TEX); *Br* 692 (TEX); *C* 67-350 (CAS); *C* 412 (DS); *C* 507 (DS); *GL* 251 (TEX); *GG* 349 (TEX); *GG* 359 (CAS, TEX); *Kim* 10031 (TEX); *RMK* 2840 (DS, TEX, UC); *RMK* 2850 (TEX); *RMK* 2858 (DS, TEX, UC); *RMK* 2869 (DS, TEX); *RMK* 2875 (TEX, UC); *RMK* 3064 (DS, TEX, UC); *L* 13 (DS); *L* 339 (DS); *L* 1167 (DS); *L* 1372 (DS); *L* 1398 (DS); *L* 1450 (DS); *L* 1713 (DS); *L* 2028 (DS); *Lo* 224 (TEX); *Lo* 353 (CAS); *Mz* 12316 (TEX); *Mz* 13833 (CAS); *Mz* 15837 (CAS); *PG* 121 (TEX); *PM* 229 (CAS, TEX); *Prat* 1118 (CAS, TEX); *R&B* 19857 (DS); *R&R&M* 962 (UC); *SC* 377 (TEX); *SC* 447 (TEX); *SI* 240 (TEX); *SI* 23319 (TEX); *SI* 3139 (TEX); *Stu* 561 (TEX); *Sund* 2427 (TEX); *T* 961 (DS, LL); *T* 1024 (DS); *T* 1206 (DS); *T* 1365 (DS); *T* 1484 (DS); *T* 1941 (DS); *T* 2118 (DS); *T* 2413 (DS); *T* 2553 (DS); *T* 2831 (DS); *T* 3663 (DS); *T* 9587 (TEX); *T* 9883 (CAS, TEX); *Vi* 816 (TEX); *Z* 10 (LL); 8251; 9449; 10408; 12524; 12978; 13289; 16159; 23308; 25889; 26423; 31898; 33439; 34235; 37795; 40974; 46795; 46922; 49352; 49971; 54358; 55131; 55944; 56817; 58295.

2. ADENOPHYLLUM

Adenophyllum Pers., Syn. pl. 458. 1807. — *Dyssodia* Cav. sect. *Adenophyllum* (Pers.) O. Hoffm. in A. Engler and K. Prantl, Naturl. Pflanz. 4(5):266. 1894. — TYPE: *Adenophyllum coccineum* Pers. = *Willdenowa glandulosa* Cav. = *Adenophyllum glandulosum* (Cav.) Strother.

For additional synonymy, see Strother (1986).

Annuals, perennials, or shrubs, (2–)10–20+ dm high; leaves opposite or alternate, pinnate with lanceolate or ovate leaflets or pinnatifid with obovate, linear, or filiform lobes, the bases, rachises, and teeth usually setose-bristly, pellucid glands marginal, often associated with bases of lobes, and subterminal in lobe-tips; heads mostly borne singly; involucre turbinate to hemispheric, 8–25 mm high; calyculi of (0–)12–22 bractlets, the bractlets often seta-tipped; phyllaries 8–20(–30), biseriate, weakly connate 1/3–2/3 their lengths, often separating and spreading with age, margins of the outer usually free to bases or nearly so, dotted with round to elliptic or elongate, pellucid glands; receptacles fimbriate or setose; ray florets none or 8–16, pistillate, fertile, corollas yellow to orange or scarlet; disc florets 30–60, bisexual, fertile, corollas yellow to orange, often tipped with scarlet, tubes shorter than throats, lobes 5, lance-linear to subulate, subequal; cypselae stoutly to narrowly obpyramidal, glabrous or pubescent; pappi of (8–)15–20 squamellae, the squamellae variously muticous, aristate, or comprised of 3–11 basally connate bristles; $x = 7, 13$.

Ten species of the southwestern United States, Mexico, Central America (to Panama), and Antilles; allied to *Comaclinium* and *Dyssodia*.

REFERENCES: STROTHER, J. L. 1969. Systematics of *Dyssodia* Cavanilles (Compositae: Tageteae). Univ. Calif. Publ. Bot. 48:1–88; ———, 1986. Renovation of *Dyssodia* (Compositae: Tageteae). Sida 11:371–378.

- a. Sprawling or clambering shrubs; leaves pinnate with 3–7(–11), ovate to lanceolate leaflets; calyculi of linear-subulate bractlets 1. *A. appendiculatum*
- aa. Coarse annuals; leaves pinnatifid into 7–13, linear to obovate lobes; calyculi of pectinate-setaceous bractlets 2. *A. porophyllum*

1. *Adenophyllum appendiculatum* (Lag.) Strother, Sida 11:377. 1986.

— *Dyssodia appendiculata* Lag., Gen. sp. nov. 28. 1816.

— *TYPE*: Mexico, Guerrero, “Hab. prope Acapulco,” *L. Néé s.n.* (not located; usage here is consistent with past usage).

ILLUSTRATION: none found.

Sprawling or clambering shrubs to 2 m high; leaves mostly opposite, pinnately parted into 3–7(–11), ovate to lanceolate leaflets, the leaflets 15–45 mm long, 7–15 mm wide, glabrous, serrate, frequently with a lance-subulate apical cusp subtended by a conspicuous pellucid gland, similar glands usually present at leaflet bases, rachises often bristly, at least at their bases; heads commonly nodding on bracteolate peduncles 5–18 cm long; calyculi of 12–20 linear-subulate, gland-bearing bractlets; involucre turbinate to hemispheric, 12–18 mm high; phyllaries

ca. 20–26, lance-linear, connate about half their length, biserrate, margins of the outer ones free nearly to bases, most phyllaries bearing 1–5 pellucid glands; ray florets 8–16, corollas orange to deep red, sometimes with laminae bright yellow abaxially, laminae narrowly to broadly ovate, 8–15 mm long; disc florets 40–60, corollas bright yellow, tipped with red, slender, mostly 12–13 mm long; cypselae slender, sparsely pubescent, 4–6 mm long; pappi of 10–15 subequal squamellae, each squamella comprising 5–9 basally connate bristles, 9–11 mm long; $2n = 26$; flowering mostly Aug–Dec.

Wooded slopes, ravines, and flats in Evergreen Seasonal, Tropical Deciduous, and Palm forests and in Thorn Woodland; common in Northern Highlands, on lower Central Plateau, in Central Depression, and on Pacific Coastal Plain, rare in Sierra Madre; 400–1170 m. Southern Mex. (Cma., Gro., Mich., Oax., Chis.). CHIAPAS COLLECTIONS: *Bo* 8188 (LE); *Cro* 46274 (CAS); *Cro* 64820 (CAS); *G* 521 (BM, MO, NY); *Har* 65 (TEX); *J* 1391 (LE); *J* 1453 (LE); *Lan* 756 (TEX); *L* 185 (DS); *SI* 3171 (TEX); *T* 3402 (DS); *Won* 2 (MICH); 20093; 20175; 27307; 30488; 30536; 36742; 42123; 46461; 46982; 47974; 66958; 70000.

Members of *A. appendiculatum* are very similar to, perhaps conspecific with, plants from Veracruz that I call *A. aurantium* (L.) Strother. In *A. aurantium*, each calyculus comprises 8–12 lanceolate bracts that intergrade with the phyllaries, disc florets number mostly 20–40, cypselae are glabrous, and pappus scales are ca. 8 mm long. In *A. appendiculatum*, each calyculus comprises 12–20 linear-subulate bracts that contrast with the phyllaries, disc florets number mostly 40–60, cypselae are sparsely pubescent, and pappus squamellae are 9–11 mm long.

2. *Adenophyllum porophyllum* (Cav.) Hemsl. in F. Godman and O. Salvin, Biol. cent.-amer., Bot. 2:218. 1881.

— *Pteronia porophyllum* Cav., Icon. 3:13, t. 225. 1794. — *Dyssodia porophyllum* (Cav.) Cav., Anales Ci. Nat. 6:334. 1803. — TYPE: Grown in Spain from Mexican seed (MA; photographs: MSC, TEX!).

All Chiapan collections of this species are referable to:

2a. *Adenophyllum porophyllum* (Cav.) Hemsl. var. *radiatum* (DC.) Strother, Sida 11:377. 1986.

— *Dyssodia porophyllum* (Cav.) Cav. var. *radiata* DC., Prodr. 5:639. 1836 [based on *Boebera alternifolia* Moc. & Sessé ex DC., Prodr. 5:639. 1836]. — TYPE: Fl. Mex. Ic. t. 636.

ILLUSTRATION: Univ. Calif. Publ. Bot. 48:42. 1969; a different var.: *Adenophyllum porophyllum* var. *cancellatum* (Cass.) Strother, as *Dyssodia porophyllum* var. *cancellata* (Cass.) Strother.

Coarse annuals, to 1(–2?) m high; leaves mostly opposite, becoming alternate distally, 20–65 mm long, pinnatifid into 7–13, linear to obovate lobes, the lobes toothed or divided, the teeth bearing setae 7–12 mm long, laminae bearing pellucid glands; heads borne on erect, bracteate peduncles 3–7+ cm long; calyculi of 6–18 pectinate-setaceous bractlets, usually bearing pellucid glands; involucre turbinate to cylindric, 5–12 mm high; phyllaries 12–18, lanceolate, connate ca. 2/3 their lengths, each keeled and bearing a pellucid gland in the keel, which runs into a cornute appendage, each phyllary usually with additional, submarginal glands; ray florets mostly 13, corollas red-orange, laminae elliptic, ca. 3 mm long; disc florets 30–60, corollas yellow, 6–9 mm long; cypselae slender, striate, glabrous or pubescent, 4–6 mm long; pappi double, the outer series of ca. 10 erose or short-awned squamellae ca. 1.5 mm long, the inner series of ca. 10 squamellae, each squamella comprising 5–9 basally connate bristles to 8 mm long; $2n = 26$; flowering mostly Sep–Nov.

Wooded slopes or ruderal in Tropical Deciduous Forest; locally common in Central Depression (vicinity of Tuxtla Gutiérrez); 530–1700 m. Southern Mex. (Ver., Yuc., Chis.), Guat., Hond., Nic.; Cuba. CHIAPAS COLLECTIONS: *F* 3260 (DS, TEX); *Lan* 750 (TEX); *Sund* 2467 (TEX); 13500; 13837; 20033; 28028; 46330; 46472; 55452; 71012.

3. ALDAMA

Aldama La Llave & Lex., Nov. veg. descr. 14. 1824. — TYPE: *Aldama dentata* La Llave & Lex.

Annuals, sometimes persisting, 1(–2.5) m high; leaves mostly opposite, the distal alternate, all petiolate, blades mostly narrowly lanceolate, triplinerved from near their bases; heads borne singly or in very loose, corymbiform clusters at ends of branches; involucre broadly campanulate, wider in fruit; phyllaries 9–12(–21+) in 2–3 series, unequal to subequal, ± appressed, usually striate-nerved; receptacles convex to hemispheric; paleae each closely investing the subtended ovary, ultimately forming a bulbous-based, short-beaked, usually rugose-wrinkled, sparingly strigose to hispid or glabrescent, or nearly glabrous, perigynium that is shed with the enclosed cypselae; ray florets none or 5–11, neuter, corollas yellow to light orange, tubes very slender, laminae ovate to broadly oblong; disc florets 30–60(8–70), bisexual, fertile, corollas yellow, sometimes with reddish lobes, tubes 10-nerved, ca. 1/2 as long as throats, lobes 5; styles bulbous-dilated at base, branches rather stout, papillate; cypselae (inside perigynium) shiny black, trigonous or flattened, obpyramidal to obliquely obovoid, glabrous, finely striate; pappi none or minute coronas; $x = 17$.

Two species of Mexico, Central America, and northern South America.

REFERENCES: FEDDEMA, C. 1971. Re-establishment of the genus *Aldama* (Compositae-Heliantheae). *Phytologia* 21:308–314; HARRIMAN, N. A. 1989. *Aldama mesoamericana* (Asteraceae: Heliantheae), a new species from Nicaragua. *Syst. bot.* 14:580–582.

1. *Aldama dentata* La Llave & Lex., Nov. veg. descr. 14. 1824.

— *Gymnopsis dentata* (La Llave & Lex.) DC., *Prodr.* 5:561. 1836. — *Sclerocarpus dentatus* (La Llave & Lex.) Benth. ex Hemsl. in F. Godman and O. Salvin, *Biol. cent.-amer., Bot.* 2:164. 1881. — TYPE: Mexico, Veracruz, Córdoba ("Florebat martio in inundatis Huehueyapa S. Josephi del Corral"), *P. La Llave* (?G, ?MA).

Gymnopsis schiedeana DC., *Prodr.* 5:561. 1836. — *Sclerocarpus schiedeana* (DC.) Benth. ex Hemsl. in F. Godman and O. Salvin, *Biol. cent.-amer., Bot.* 2:164. 1881. — TYPE: Mexico, Veracruz, "inter segetes ad margines dumetorum prope Jalappam," C. J. W. Schiede 255 (? HAL; isotype: MO).

Sclerocarpus kerberi Fourn., *Bull. Soc. Bot. France* 20:183. 1883. — TYPE: Mexico, Veracruz, Córdoba, 31 Jul 1882, E. Kerber 19 (M; isotype: K).

Sclerocarpus schiedeana (DC.) Benth. ex Hemsl. var. *elongatus* Greenm., *Proc. Amer. Acad. Arts* 32:309. 1897. — *Sclerocarpus elongatus* (Greenm.) Greenm. & C. H. Thoms., *Ann. Missouri Bot. Gard.* 1:412. 1915. — LECTOTYPE (Fedde 1971:311): Mexico, Morelos, "fields around Cuernavaca," 31 Oct 1896, C. G. Pringle 6606 (MO; isoclectotypes: GH, MICH, NY, US, VT).

Gymnolomia acuminata S. F. Blake ex B. L. Rob., *Proc. Amer. Acad. Arts* 49:505. 1913. — TYPE: Mexico, Tamaulipas, "prope Gómez Farias," 13–21 Apr 1907, E. Palmer 582 (GH; isotypes: F, NY, US).

See Fedde (1971) for additional synonymy.

ILLUSTRATION: Fig. 2.

Annual or persisting herbs, 3–15(–25) dm high; petioles 2–15 mm long, leaf blades lanceolate to lance-linear, 25–100 mm

long, 4–37 mm wide, bases cuneate, margins entire or very finely serrate, apices acute to attenuate, faces densely and finely strigillose to sparsely strigose and minutely resinous/gland-dotted; peduncles ebracteate, 3–15 cm long; phyllaries narrowly lanceolate to obovate, 3–7 mm long, the outer shorter and narrower than the inner, all herbaceous-membranous with indurate to cartilaginous bases, usually strigose and often marked with purplish to blackish nerves and mottlings, some or all ciliate and scarious-margined; paleae stramineous to purple or mottled, 4–7+ mm long; ray corolla tubes ca. 1.5 mm long, sparsely hairy distally, laminae mostly 5–15 mm long; disc corolla tubes stout, 0.9–1.4 mm long, throats dilated, obconic to funnelform, 1.5–2.3 mm long, lobes lance-triangular 0.7–0.9 mm long, sparsely and minutely pubescent abaxially; cypselae ca. 3 mm long; $2n = 34$; flowering mostly Oct–Nov.

Moist slopes and disturbed places in Lower Montane Rain, Montane Rain, Evergreen Seasonal, Tropical Deciduous, Pine-Oak-Liquidambar, and Pine-Oak forests; common in Northern Highlands and on Central Plateau, less so in Central Depression and Sierra Madre; 100–1860 m. Mex. (S Tam., Nay., Jal., Qro., to Ver., Oax., Chis.), Guat., Bel., Hond.; northern S.A. (Ven.). CHIAPAS COLLECTIONS: *Cro* 40387 (CAS); *Cro* 65072 (TEX); *RMK* 3103 (DS, TEX, UC); *Mz* 16820 (TEX); *Neff* 93-4-14-18 (TEX); *Sl* 2367 (TEX); *T* 1693 (DS); *T* 1769 (DS); *T* 1934 (DS, LL); *T* 4696 (CAS); *T* 7462 (TEX); *TC* 11561 (TEX); *Z* 2 (DS); 6120; 7466; 7537; 12007; 20004; 26642; 34309; 40553; 41203; 41891; 46109; 46781; 46813; 46920; 46959; 48869; 49221; 50545; 50899; 52153; 52687; 53816; 54281; 55444; 56841.

Plants with exceptionally narrow leaves (25–45 mm long by 4–6 mm wide) from the Gulf Coastal Plain at 100–250 m (e.g., *D. E. Breedlove* 26642, 46813) may represent an unnamed variety of this species.

4. ALEPIDOCLINE

Alepidocline S. F. Blake, *J. Wash. Acad. Sci.* 34:440. 1934. — TYPE: *Alepidocline annua* S. F. Blake.

Annuals, perhaps persisting, usually erect, sometimes sprawling, stems rarely more than 5 dm long; leaves opposite, petiolate, blades triplinerved from near their bases, deltate-ovate to rhombic or ovate, margins variously serrate or entire, apices acute to attenuate, faces sparsely strigillose to strigose or pilose; heads mostly borne singly and terminal, sometimes arising in distal axils; peduncles 1–6 cm long, pilose or pilose and stipitate-glandular; involucre urceolate to campanulate to hemispheric, 5–10 mm diam.; phyllaries 18–30 in 3–4 series, unequal, thinly herbaceous to membranous, striate-nerved, often distally scarious and purplish, faces typically glabrous, margins sometimes distally ciliate; receptacles ovoid to conical; paleae lacking, or caducous, when present: stramineous to hyaline, scarious, lanceolate to spatulate or linear (sometimes mixed in single heads); ray florets 8–13+, pistillate, fertile, corollas inconspicuous to showy, abaxially pinkish to purplish, adaxially white to pinkish, tubes slender, ca. 3 mm long, laminae spatulate to oblong, 3-toothed; disc florets 10–150, bisexual, fertile, corollas yellow, tubes equal to or longer than the gradually dilated or abruptly campanulate throats, tubes puberulent to hirsutulous, throats glabrous or nearly so, lobes 5, deltate, wholly glabrous or abaxially papillate; style branches minutely hispidulous; cypselae black, shiny, obovoid, ± compressed, glabrous; pappi none or of 8–10, caducous, barbellate setae; $x = 8$.

Four or so species in Mexico, Central America, and South America. Closely allied with other genera of Galinsoginae.

- a. Involucre mostly 5–8 mm diam.; inner phyllaries mostly ovate to lanceolate, acute; laminae of ray corollas ca. 2 mm long. 1. *A. annua*

- aa. Involucres mostly 7–10 mm diam.; inner phyllaries mostly obovate, rounded; laminae of ray corollas 7–15 mm long. 2. *A. breedlovei*

1. ***Alepidocline annua*** S. F. Blake, J. Wash.
Acad. Sci. 34:441, f. 2. 1934.

— *Sabazia annua* (S. F. Blake) B. L. Turner, Wrightia 5:304. 1976. — TYPE: Guatemala, Chimaltenango, Chichavac, 2430 m, 2 Dec 1933, A. F. Skutch 722 (US).

Sabazia brevilingulata B. L. Turner, Wrightia 5:304. 1976. — TYPE: Mexico, Chiapas, Municipio Motozintla de Mendoza, N and W slope of Mozotal, 3000 m, 18 Nov 1971, D. E. Breedlove 22718 (DS!; isotype: LL).

Galinsoga macrocephala H. Rob., Phytologia 44:429. 1979. — TYPE: Venezuela, Merida, El Delgadito ad El Portochuelo, 2700 m, 18 Nov 1976, A. Charpin et al. 13531 (US).

ILLUSTRATION: Fig 3.

Mostly erect and annual, sometimes persisting and sprawling, mostly 2–4 dm high; petioles 2–25 mm long, leaf blades delatate-ovate to rhombic or ovate, 15–45(–60) mm long, 12–20(–40) mm wide, bases cuneate to truncate, margins serrate, apices acute to somewhat acuminate, abaxial faces sparsely pilose, adaxial faces strigillose; heads borne singly at ends of branches and in distal axils; peduncles mostly 2–6 cm long, sparsely to densely pilose or pilose and stipitate-glandular; involucres broadly campanulate, mostly 5–8 mm diam.; phyllaries mostly 18–24, the outer lance-ovate, 2–4 mm long, the inner lanceolate, 4.5–6.5 mm long, acute, all distally scarious and, usually, purplish; receptacles ovoid to conic, ca. 2 mm high; paleae mostly wanting, at least distally, hyaline, linear, ca. 2 mm long; ray florets mostly 8(–13), corollas white to pinkish, tubes very slender, ca. 3 mm long, puberulent, laminae oblong, ca. 2 mm long, shortly trifid; disc florets 10–80, corollas pale yellow, 2.5–3 mm long, proximally puberulent, tubes very slender, 1.3–1.7 mm long, throats scarcely ampliate, 0.7–0.9 mm long, lobes delatate, ca. 0.3 mm long; style branches ca. 0.4 mm long, minutely hispidulous; cypselae black, obovoid, somewhat flattened, ca. 1.8 mm long, glabrous; pappi of ca. 8, caducous, barbellulate setae 1–1.5 mm long; flowering mostly Nov.

Openings in Evergreen Cloud Forest on Cerro Mozotal and Volcán Tacaná in E Sierra Madre; 2800–3500 m. Southern

Mex. (Chis.), Guat.; S.A. (Ven.). CHIAPAS COLLECTIONS: 22718; 29409; 31776; 41730; 55872.

2. ***Alepidocline breedlovei*** (B. L. Turner) B. L. Turner, Phytologia 69: 389. 1990.

— *Sabazia breedlovei* B. L. Turner, Wrightia 5:303. 1976. — TYPE: Mexico, Chiapas, Municipio Motozintla de Mendoza, 45–50 km NE of Huixtla on road to Motozintla, 1900 m, 17 Nov 1971, D. E. Breedlove 22632 (DS!; isotype: LL).

ILLUSTRATION: none found.

Erect, annuals, to 5+ dm high; petioles 8–50 mm long, leaf blades narrowly to broadly rhombic to ovate, 5–8(–11) cm long, 2–4(–6) cm wide, bases cuneate, margins serrate, apices attenuate, abaxial faces sparsely pilose to strigose, adaxial faces sparsely strigose; heads 1–3 at ends of branches; peduncles mostly 1–4(–6) cm long, pilose or pilose and stipitate-glandular; involucres hemispheric, mostly 7–10 mm diam.; phyllaries 20–30 in 3–4 series, the outer lanceolate to ovate, 2–4 mm long, the inner mostly ovate to obovate, 6–7 mm long, rounded, all glabrous, distally scarious and, often, purplish; receptacles ovoid, ca. 3 mm high; paleae dimorphic: hyaline, lanceolate, 1–2.5 mm long and stramineous, linear, 2–3.5 mm long in same head, all mostly deciduous, sometimes distally wanting; ray florets 8–13, corollas white, tubes ca. 3 mm long, puberulent, laminae narrowly oblong to spatulate, 7–15 mm long; disc florets ca. 100–150, corollas yellow, ca. 3.5 mm long, tubes ca. 1.5 mm long, hirsutulous, throats ampliate, campanulate, ca. 1.5 mm long, glabrous or nearly so, lobes delatate, ca. 0.5 mm long, abaxially papillate; style branches 0.5–0.6 mm long, minutely hispidulous; cypselae blackish, obovoid, somewhat compressed laterally, ca. 1.5 mm long, glabrous; pappus of ca. 10, caducous, barbellulate setae 1–1.5 mm long; $2n = 16$; flowering Oct–Nov.

Chiapas endemic: Montane Rain Forest on Cerro Mozotal in E Sierra Madre; 1900–2100 m. CHIAPAS COLLECTIONS: 22632; 41764; 46179; 46197; 55808.

5. ALLOISPERMUM

Alloispermum Willd., Ges. Naturf. Freunde Berlin Mag. Nuesten Entdeck. Gesamnten Naturk. 1:139. 1807. — LECTOTYPE (H. Robinson 1978:411): *Allocarpus caracasanus* Kunth \equiv *Alloispermum caracasenum* (Kunth) H. Rob.

Calydermos Lag., Gen. sp. pl. 24. 1816, non Ruiz & Pav. 1799. — TYPE: None designated; use adopted here is consistent with protologue.

Allocarpus Kunth, Nov. gen. sp., ed. fol. 4:228. 1820 [1818]; ed. qto. 4:291. 1820. — TYPE: *Allocarpus caracasanus* Kunth \equiv *Alloispermum caracasenum* (Kunth) H. Rob.

Calebrachys Cass. in F. Cuvier, Dict. sci. nat., ed. 2. 55:265, 277. 1828. — *Calydermos* Lag. sect. *Calebrachys* (Cass.) DC., Prodr. 5:669. 1836. — TYPE: *Calea peduncularis* Kunth \equiv *Calebrachys peduncularis* (Kunth) Cass. ex Less., Syn. gen. Compos. 241. 1832. = *Alloispermum scabrum* (Lag.) H. Rob.

Herbaceous perennials or suffrutices, erect to subscandent, to 5 m tall; leaves opposite, sessile or petiolate, blades elliptic-ovate to lanceolate or lance-linear, 3–5-nerved from near their bases, margins entire or toothed, abaxial faces strigoso-pilose to glabrate or glabrous, adaxial faces strigose or scabrelous to glabrate or glabrous, neither face with glandular trichomes or resin globules; capitulescences loose to compact clusters of 8–20(1–60) heads in terminal and/or axillary, often corymbiform or paniculiform aggregations; peduncles usually stout, 1–6(–12) mm long, piloso-hispid to pilosulous; involucres campanulate to

turbinate or hemispheric, 3–9 mm high; phyllaries mostly 12–20+, strongly graduate (the outer shortest) in 2–3(–5) series, mostly stramineous or purplish, usually herbaceo-chartaceous with scarious margins and tips, variously ovate to lanceolate, usually striate-nerved; receptacles convex to conic; paleae usually stramineous, striate-nerved, scarioso-chartaceous, oblong to lanceolate or lance-linear, weakly to strongly navicular, often acuminate or trifid with acuminate to subulate central lobe, mostly glabrous; ray florets none or 3–23, pistillate, fertile, corollas showy to inconspicuous, whitish, sometimes marked with purple abaxially, tubes usually pilosulous, laminae ovate to flabellate, 2–3-lobed; disc florets 8–50(–150), bisexual, fertile, corollas yellow or ochroleucous, tubes usually shorter than or equal to the throats, usually densely piloso-hispidulous, throats funnelliform to cylindro-campanulate, sparsely pilosulous (at least on nerves) or glabrous, lobes 5, deltate to lance-deltate, abaxially sparsely pilosulous, adaxially papillate; style branches slender to stout, stigmatic almost to rounded tip; cypselae blackish or purplish, obpyramidal to obconic, often somewhat oblique or arcuate, ray cypselae glabrous, disc cypselae pubescent or glabrous; ray pappi none or of 14–20, lance-subulate squamellae, disc pappi none or of 1–3 or 10–20, lance-subulate to oblanceolate or spatulate, entire to erose or lacerate squamellae; $x = 8$.

Half a dozen or so species that range from Mexico through Central America into South America. Closely allied with *Sabazia*.

REFERENCE: ROBINSON, H. 1978. Studies in the Heliantheae (Asteraceae). IX. Restoration of the genus *Alloispermum*. *Phytologia* 38:411–412.

- a. Plants mostly 1–2(–4) m high; involucre 3–5 mm high; phyllaries 14–20+, ovate to lance-ovate, acute; disc corollas mostly ochroleucous to pale yellow, mostly 2.5–3.8 mm long; pappi of 14–20, lance-subulate squamellae 2–3.5(–4.5) mm long 1. *A. integrifolium*
- aa. Plants mostly 3–7(–10) dm high; involucre 4–7 mm high; phyllaries 12–16+, oblong to ovate, rounded-obtuse; disc corollas pale to bright yellow, mostly 3.7–5 mm long; pappi none or of 10–12, spatulate to lanceolate squamellae 0.8–1.5(–3) mm long 2. *A. scabrum*

1. *Alloispermum integrifolium* (DC.) H. Rob., *Phytologia* 38:411. 1978.

— *Allocarpus integrifolius* DC., *Prodr.* 5:676. 1836. — *Calea integrifolia* (DC.) Hemsl. in F. Godwin and O. Salvin, *Biol. cent.-amer.*, Bot. 2:205. 1881. — TYPE: Mexico, W. F. Karwinski s.n. (?M; isotype: fragment in G-DC?).

Calea integrifolia (DC.) Hemsl. var. *dentata* J. M. Coul., Bot. Gaz. 20:51. 1895. — TYPE: Guatemala, El Quiché, Nebaj, 7000 ft. [2134 m], Apr 1890, E. T. Heyde and E. Lux 4506 (F).

Calea colimensis McVaugh, *Contr. Univ. Michigan Herb.* 9:410. 1972. — *Alloispermum colimense* (McVaugh) H. Rob., *Phytologia* 41:33. 1978. — TYPE: Mexico, Jalisco, Nevado de Colima, 2850 m, 2 Apr 1951, R. McVaugh 11704 (MICH).

ILLUSTRATION: *Contr. Univ. Michigan Herb.* 9:411. 1972, as *Calea colimensis*.

Perennial herbs, 1–2(–4) m high; stems strongly pilose or hirsute to puberulent or glabrate; leaves subsessile or on petioles to 15(–25) mm long, blades broadly to narrowly lanceolate to lance-linear, 6–12(–16) cm long, 1.5–3(–6) cm wide, 3–5+ nerved from near bases, bases rounded or subcordate, sometimes oblique, margins entire to coarsely toothed, apices acuminate to attenuate, abaxial faces densely to sparsely pilose to glabrate or glabrous, adaxial faces piloso-strigose to glabrate or glabrous; heads 12–30(8–60) in rounded, corymbiform or paniculiform, terminal and axillary clusters 3–8 cm across; peduncles mostly 1–5(–10) mm long, densely to sparsely pilose; involucre campanulate to hemispheric, 3–5 mm high; phyllaries 14–20+, greenish to stramineous or purplish, chartaceous with scarious margins, ovate to lance-ovate or lanceo-

late, mostly acute at tip, striate, ciliolate, abaxially sparsely pilosulous to glabrate or glabrous; receptacles convex to conic; paleae lanceolate to lance-linear, 3.5–5 mm long; ray florets none or 5–8(–12), corollas white or ochroleucous, tubes 1–2.5 mm long, pilose, laminae ovate to flabellate, 1–5 mm long; disc florets 12–30+, corollas ochroleucous to pale yellow, tubes 1–1.5 mm long, throats narrowly funnelliform, 1–1.5 mm long, lobes deltate, 0.5–0.8 mm long; style branches 0.8–1 mm long; cypselae 1–1.5 mm long, of ray glabrous and epappose, of disc hirsutulous and pappose; pappi of 14–20, white, lance-subulate, subequal, often lacerate, squamellae 2–3.5(–4.5) mm long; $2n = 32$; flowering mostly Dec–Mar.

Disturbed places, often ruderal, in Montane Rain, Evergreen Cloud, Pine-Oak-Liquidambar, and Pine-Oak forests; common on Central Plateau and in Sierra Madre, uncommon in Northern and Eastern highlands; 1200–2200(760–2620) m. Mex. (Dgo., S.L.P., Jal., Hgo., Mich., Méx., D.F., Mlos., Pue., Ver., Gro., Oax.), Guat., Hond., Salv., Nic. CHIAPAS COLLECTIONS: *Br* 632 (TEX); *Br* 704 (TEX); *Br* 900 (TEX); *Brooks* 54-4 (TEX); *Brooks* 58-8 (TEX); *Cro* 64861 (CAS, TEX); *Cro* 65077 (CAS); *Den* 1645 (ENCB, F, MICH); *Gar* 587 (DS, TEX); *GL* 265 (TEX); *GL* 293 (TEX); *GS* 53 (CAS); *He* 766 (TEX); *He* 2173 (CAS); *HM* 521 (DS); *Kim* 10045 (TEX); *L* 464 (DS); *L* 493 (DS); *Lo* 218 (CAS, TEX); *Lo* 248 (CAS); *Lo* 380 (CAS); *M-I* 192 (CAS); *EM* S-68 (MICH); *EM* 852 (MEXU, MICH); *EM* 2003 (LL, MEXU); *EM* 5089 (CAS, LL); *Neff* 93-4-12-3 (TEX); *PM* 220 (CAS, TEX); *Prat* 1139 (TEX); *SC* 320 (TEX); *SC* 437 (TEX); *SC* 545 (TEX); *SR* 646 (TEX); *SI* 3132 (CAS, TEX); *Sund* 2379 (CAS, TEX); *T* 408 (DS); *T* 624 (DS, TEX); *T* 2108 (DS); *T* 2208 (DS); *T* 2222 (DS); *T* 3511 (DS); *T* 3688 (DS); *T* 3918 (DS); *T* 7368 (TEX); *T* 8162 (TEX); *T* 9561 (TEX); *T* 9712 (TEX); 7924; 8186; 8255; 8808; 9383; 11746; 16126; 23995; 24384; 30960; 31620; 33495; 42470; 42587; 46390; 48205; 49783; 50004; 50059; 50121;

50268; 50442; 50944; 56433; 56986; 58060; 58268; 58504; 68581.

2. *Alloispermum scabrum* (Lag.) H. Rob., Phytologia 38:412. 1978.

- *Calydermos scaber* Lag., Gen. sp. pl. 25. 1816. — *Calea scabra* B. L. Rob., Proc. Amer. Acad. Arts 44:625. 1909. — TYPE: Mexico, "Hab. in Santa Monica, Guanajuato, Acapulco et Real de Monte oppodis Imperii Mexicani. ... (V.S. Fl. fr.)," ?M. Sessé and J. M. Mociño (?MA).
Calydermos longifolius Lag., Gen. sp. pl. 25. 1816. — *Calea peduncularis* Kunth var. *longifolia* (Lag.) A. Gray, Proc. Amer. Acad. Arts 22:430. 1887, illegit., did not use oldest species epithet. — *Calea scabra* (Lag.) B. L. Rob. var. *longifolia* (Lag.) B. L. Rob., Proc. Amer. Acad. Arts 44:625. 1909. — TYPE: Mexico, "Hab. in N. Hisp.," ?M. Sessé and J. M. Mociño (?MA).
Calea peduncularis Kunth, Nov. gen. sp., ed. fol. 4:232. 1820 [1818]; ed. qto. 4:295. 1820. — *Calebrachys peduncularis* (Kunth) Cass. ex Less., Syn. gen. Compos. 241. 1832. — *Calydermos peduncularis* (Kunth) DC., Prodr. 5:669. 1836. — *Calea scabra* (Lag.) B. L. Rob. var. *peduncularis* (Kunth) B. L. Rob., Proc. Amer. Acad. Arts 44:625. 1909. — TYPE: Mexico, Michoacán, "Crescit in monte ignivomo Jorullo, alt. 500 hex. [900 m]," Sep, A. von Humboldt and A. J. A. Bonpland s.n. (P, microfiche!).
Calydermos peduncularis (Kunth) DC. var. *epapposa* Kunth ex DC., pro syn. et nom. dubium, Prodr. 5:669. 1836. — *Calea peduncularis* Kunth var. *epapposa* (DC.) B. L. Rob. & Greenm., Proc. Amer. Acad. Arts 32:23. 1896, illegit., did not use oldest species epithet. — TYPE: Mexico, Guanajuato, "prope Sanctum Rosam," A. von Humboldt and A. J. A. Bonpland s.n. (P, microfiche!).
Calea peduncularis Kunth var. *livida* B. L. Rob. & Greenm., Proc. Amer. Acad. Arts 32:24. 1896, illegit., did not use oldest species epithet. — *Calea scabra* (Lag.) B. L. Rob. var. *livida* (B. L. Rob. & Greenm.) B. L. Rob., Proc. Amer. Acad. Arts 44:625. 1909. — LECTOTYPE (Wussow et al. 1985:264): Mexico, Jalisco, on the Rio Blanco, E. Palmer "317" (GH; isotypes: MO, NY).
Calea thysanolepis B. L. Rob. & Greenm., Proc. Amer. Acad. Arts 32:22. 1896. — TYPE: Mexico, Guerrero, Sierra Madre, near Chilpancingo, 9000–10,200 ft. [2743–3111 m], 24 Dec 1894, E. W. Nelson 2211 (GH).

Calea purpusii Brandegee, Univ. Calif. Publ. Bot. 10:119. 1924. — TYPE: Mexico, Chiapas, Hacienda Monserrate, Sep 1923, C. A. Purpus 9103 (UC).

Calea scabra (Lag.) B. L. Rob. var. *palustris* McVaugh, Contr. Univ. Michigan Herb. 9:412. 1972. — TYPE: Mexico, Nayarit, 6–8 km N of Compostela, 800–900 m, 5 Sep 1960, R. McVaugh 18732 (MICH; isotypes: ENCB, NY).

ILLUSTRATION: none found.

Perennial herbs, 3–7(–10) dm high; stems hirsute or pilosulous to glabrate or glabrous; leaves sessile or nearly so, blades lance-ovate to lance-linear, 3–8(–15) cm long, 1–3(–5) cm wide, 3–5+-nerved near bases, bases cuneate to rounded, margins remotely toothed, apices acute to attenuate, abaxial faces shaggy strigoso-pilose to glabrate or glabrous, adaxial faces scabrelous to glabrate or glabrous; heads usually 8–20+ in compact, corymbiform clusters 3–8 cm across; peduncles typically 1–6(–12) mm long (exceptionally to 5 cm long), densely pilose to pilosulous; involucre turbinate to campanulate, 4–7 mm high; pyllaries 12–16+, stramineous, chartaceous, striate, oblong to ovate, mostly rounded-obtuse at tip, marginally and distally scarious, sparsely pilose or glabrous abaxially, often ciliate; receptacles conic; paleae oblong to lance-linear, 4–6 mm long; disc florets 8–20+, corollas pale to bright yellow, tubes stout, 1.2–1.5 mm long, throats cylindro-campanulate, 1.8–2.5 mm long, lobes deltate, 0.7–1 mm long; style branches ca. 1 mm long; cypselae 1.5–2.5 mm long, closely hispidulous or glabrous (in same head); pappi none or of 10–12, whitish, spatulate or lanceolate, subequal squamellae 0.8–1.5(–3) mm long; $2n = 30, 32, 34$; flowering Jul–Dec.

Openings and understory, often in wet places, in Evergreen Cloud, Evergreen Seasonal, Pine-Oak-Liquidambar, and Pine-Oak forests; very common on Central Plateau, uncommon in Northern and Eastern highlands, Central Depression, and Sierra Madre; 1200–2100(900–2900) m. Mex. (Tam., Dgo., Zac., S.L.P., Nay., Jal., Aguasc., Gto., Qro., Mich., Mlos., Tlax., Pue., Ver., Oax., Chis.), Guat. CHIAPAS COLLECTIONS: C 360 (DS); C&L 75 (CAS); ADS 848 (DS); G-P 2542 (DS); GS 30 (CAS); GS 189 (TEX); GS 303 (TEX); GS 333 (TEX); EM 4745 (GH, LL, MEXU, MO, NY); P 9103 (UC); R&B 19892 (DS); R&R&M 965 (MICH, TEX); SC 664 (TEX); SC 721 (CAS, TEX); SC 826 (TEX); SI 2335 (TEX); T 1029 (DS, LL); T 1175 (DS, LL); T 1502 (DS); T 1630 (DS); T 9315 (CAS, TEX); BLT 15445 (TEX); We 17759 (DS); TW 2392 (TEX); 6084; 6671; 6851; 11203; 11867; 11960; 12055; 12520; 12999; 13764; 26385; 27043; 27980; 36959; 41124; 41293; 46574; 48480; 51774; 52019; 52051; 52544; 53888; 54809; 55997; 66001.

6. AMBROSIA

Ambrosia L., Sp. pl. 987. 1753. — LECTOTYPE (N. L. Britton and A. Brown, Ill. Fl. N. U.S., ed. 2. 3:340. 1913): *Ambrosia maritima* L.

Gaertneria Medik., Philos. Bot. 1:45. 1789. ≡ *Franseria* Cav., nom. conserv.

Franseria Cav., Icon. pl. 2:78. 1793, nom. conserv. — TYPE: *Franseria ambrosioides* Cav., nom. illegit. = *Ambrosia arborescens* Mill.

See Payne (1964) for account of additional synonymy.

Annuals, perennials (some rhizomatous), suffrutices, and shrubs, to 2+ m high; leaves opposite or alternate or both, petiolate or sessile, blades often pinnately or palmately lobed or dissected, usually hairy and dotted with resin globules; capitulescences usually racemiform or spiciform; heads mostly unisexual (plants bisexual), the pistillate heads mostly proximal to the staminate; pistillate heads in 1–25+ fascicles in upper axils of leaves, each fascicle of 1–5(–10+) heads, each head sessile or nearly so and

subtended by a bractlet, the 5–13(–50+) phyllaries connate, ultimately forming a perigynium around the 1–2(–7) corollaless florets, each floret in an essentially separate locule; staminate heads 6–50(–100+) in each capitulescence, sessile or pedunculate and nodding; involucre of staminate heads hemispheric to saucer-shaped, often oblique, 2–8(–12) mm in diam., the 5–15+ phyllaries connate to the subtire to lobulate margin of the cupule; receptacles (staminate) flat or convex; paleae (staminate heads) filiform to linear or spatulate; functionally staminate florets 10–60(–150+) per head, corollas ochroleucous or hyaline, tube slender, much shorter than the campanulate throat, lobes (4–)5, broadly deltate; stamens usually with connate or cohering filaments and weakly connivent or free anthers; styles unbranched, capitate; “fruits” hard, beaked, smooth to tuberculate or spiny, roughly globose to obovoid or fusiform, 2–10(–20) mm long, the cypselae proper purplish black, globose to pyriform, smooth or wrinkled; pappi none; $x = 18$.

A New World genus of 30–40+ species, mostly North American, some ruderal. Morphology of capitulescences, flowers, and “fruits” depart from typical composites; the differences reflect adaptations for wind-pollination and for dispersal of seeds.

REFERENCE: PAYNE, W. W. 1964. A re-evaluation of the genus *Ambrosia* (Compositae). *J. Arnold Arbor.* 45:401–430 + 8 plates.

1. ***Ambrosia cumanensis* Kunth, Nov. gen. sp., ed. fol. 4:216. 1820 [1818]; ed. qto. 4:276. 1820.**

— *Ambrosia paniculata* Rich. var. *cumanensis* (Kunth) O. E. Schulz in I. Urban, *Symb. antill.* 7:86. 1911. — TYPE: Venezuela, “prope Cumana,” Sep. *A. von Humboldt and A. J. A. Bonpland s.n.* (P, photograph!).

ILLUSTRATIONS: Fig. 4; *Ann. Missouri Bot. Gard.* 62:1093. 1975 [Fl. Pan.].

Rhizomatous herbs, 3–8(–12) dm high; aerial stems often hirsute, sometimes hispidulous or glabrate; leaves alternate, petioles 1–6 cm long, very narrowly winged, or mostly so, blades roughly deltate to lance-ovate in overall outline, 3–8+ cm long, raggedly pinnatifid to bipinnatifid, sinuses mostly rounded, sometimes acute, ultimate divisions or lobes spatulate to lance-linear with rounded to acute apices, mostly 5–30 mm long, 2–20 mm wide, abaxial faces densely to sparsely strigillose or piloso-hirsutulous and dotted with resin globules, adaxial faces similar, less hairy; capitulescences mostly 5–15 cm long, each with 8–100+ staminate heads; pistillate heads 1–5(–10) per fascicle, 2–5(–25) fascicles per axis, each head 1-flowered, subtended by a lance-ovate to lance-linear bract, 2–5+ mm long; staminate heads nodding on peduncles 0.5–3

mm long, involucre hemispheric to saucer-shaped, 2–4 mm diam., piloso-strigillose, margins nearly entire to undulate, paleae filiform, florets 12–30 per head, corollas 1.5–2.5 mm long; perigynia stramineous to greenish or purplish, obovoid to fusiform, 2–5 mm long, obscurely tuberculate to spiny, usually piloso-strigillose, sometimes glabrate, dotted with resin globules, cypselae 1–2 mm long; $2n = 27, 36$; flowering mostly Jun–Oct.

Ruderal, mostly in damp to wet places in Evergreen Cloud, Evergreen Seasonal, and Pine-Oak forests and in Herbaceous Marsh; common on Central Plateau, less so on Gulf Coastal Plain and in Northern Highlands, Eastern Highlands, and Central Depression; 500–2000(125–2800) m. Southern Mex. (Mich., Méx., Ver., Oax., Chis.), C.A., Antill., S.A. (Col., Ven., Braz.). CHIAPAS COLLECTIONS: *Cro* 40452 (CAS, UC); *Cro* 66138 (UC); *GS* 293 (CAS, TEX); *EL* 5255 (DS); *L* 1100 (DS); *L* 2505 (DS); *EM* 5788 (LL); *T* 1367 (DS); *T* 9370 (TEX); 6792; 7104; 7337; 8321; 10243; 10486; 10915; 11251; 11897; 14431; 14557; 20062; 26148; 27785; 28756; 37794; 39742; 39763.

On specimens in LL/TEX, B. L. Turner has used the name *Ambrosia peruviana* Willd. for these plants.

7. BALTIMORA

Baltimora L., *Mant. pl.* 158. 1771. — TYPE: *Baltimora recta* L. See Stuessy (1973) for full synonymy.

Erect annuals, to 3 m high; leaves opposite, petiolate, blades mostly deltate to rhombic, trullate, or ovate, triplinerved from near their bases, margins serrate, faces scabrous to strigose or hispidulous and minutely resinous-dotted; heads borne singly or, more commonly, loosely clustered, sometimes in paniculiform clusters; peduncles slender, naked; involucre obconic to broadly campanulate, mostly 4–6 mm high; phyllaries 5–8+ in 2–3 series, subequal, basally chartaceous, distally herbaceous; receptacles very small, convex; paleae similar to inner phyllaries or much thinner and narrower, somewhat infolding the disc florets; ray florets 2–8, pistillate, fertile, corollas yellow, inconspicuous to showy; disc florets 2–20+, functionally staminate, corollas pale yellow, tubes much shorter than the broadly funnelliform throats, lobes 5; styles undivided, distally hispidulous; cypselae (ray only) greenish black, obpyramidal, triquetrous, often winged on the angles, sparsely hairy at truncate apices; pappi none or minute crowns; $x = 15$.

Two species ranging from southern Mexico to South America; one adventive in Old World tropics.

REFERENCE: STUESSY, T. F. 1973. Revision of the genus *Baltimora* (Compositae, Heliantheae). Fieldiana, Bot. 36:31-49.

1. *Baltimora recta* L., Mant. pl. 288. 1771.

— *Baltimora trinervata* Moench, Methodus 592. 1794 [nom. superfl.] — *Timanthea tristis* Salisb., Prodr. 208. 1796 [nom. superfl.] — *Fougerouxia recta* (L.) DC., Prodr. 5:510. 1836. — *Baltimora recta* L. var. *genuina* Hassler, Feddes Repert. Spec. Nov. Regni Veg. 12: 370. 1913. — TYPE: "Habitat in Marilandia, ad urbem Baltimore," cultivated, Hort. Upsal. (cf. Stuessy 1973).

Baltimora alba Pers., Syn. pl. 2:489. 1807. — *Millieria alba* [Hort. ex] Pers., Syn. pl. 2:489. 1807 [pro syn.] — *Fougerouxia alba* (Pers.) DC., Prodr. 5:510. 1836. — TYPE: "in horto Trianensi culta. (Herb. Rich.); not located, cf. Stuessy 1973.

Scolospermum baltimoroides Less., Linnaea 5:152, t. 2, figs. 19-21, 23-31. 1830. — *Baltimora scolospermum* Steetz in B. C. Seemann, Bot. voy. Herald 154. 1854 [nom. superfl.] — *Baltimora recta* L. var. *scolospermum* (Steetz) Hassl., Feddes Repert. Spec. Nov. Regni Veg. 12: 370. 1913. — TYPE: Mexico, "Santa Fe [Fé]," Jul 1828, C. J. W. Schiede and F. Deppe 335 (B, destroyed).

See Stuessy 1973 for additional synonymy.

ILLUSTRATION: Fig. 5.

Annuals, 2-12(-30) dm high, stems often maculate, square in cross section; petioles 8-55 mm long, leaf blades deltate to

rhombic or trullate, 3-10(-15) cm long, 1-6(-12) cm wide, faces strigose to hispidulous with short and longer hairs and minutely resin-dotted; peduncles mostly 1-4 cm long; involucre broadly campanulate, mostly 4-6 mm high; phyllaries mostly 5-8+, ovate to oblanceolate, often attenuate, sparsely strigose in lines from the base and distally ciliate; paleae oblanceolate and similar to inner phyllaries or much thinner and narrower; ray florets 3-8, corollas yellow, tubes ca. 1 mm long, laminae narrowly ovate, 4-6 mm long; disc florets 15-20+, corollas pale yellow, tubes ca. 0.5 mm long, throats ca. 1.3 mm long, lobes broadly deltate, minutely ciliate, ca. 0.5 mm long; cypselae (ray only) 2.5-3.5 mm high; pappi none; $2n = 30$; flowering Jul-Oct.

Fields, roadsides, and streambanks in Tropical Deciduous and Evergreen Seasonal forests and in Savanna; uncommon on Pacific Coastal Plain, on lower Central Plateau, in Central Depression, and in Sierra Madre; 100-900 m. Mex. (Ver., Yuc., Chis.) and C.A. (throughout); adventive in Old World tropics. CHIAPAS COLLECTIONS: *Calz 3503* (TEX); *Fi 35285* (F, MO, NY, TEX, UC); *RMK 3114* (DS, MICH, NY, TEX, UC, MO); *RMK 3127* (MICH, TEX); *RMK 3431* (DS, MICH, NY, TEX, UC, US); *Roe 830* (MICH); *SI 2386* (TEX); *T 3074* (DS); *We 17851* (DS); *11798*; *19846*; *26932*; *28564*; *36774*; *36862*; *37643*; *51724*; *52804*.

8. BIDENS

Bidens L., Sp. pl. 831. 1753. — LECTOTYPE (N. L. Britton and A. Brown, Ill. Fl. n. U.S., ed. 2. 3:494. 1913.): *Bidens tripartita* L.

Delucia DC., Prodr. 5:633. 1836. — TYPE: *Delucia ostruthioides* DC.

Erect to sprawling or decumbent, annual or perennial herbs, sometimes shrubs or vines, stems mostly 1-2(-30) m long; leaves mostly opposite, rarely whorled, sometimes the distal alternate, variously simple or, more often, 1-2(-3)-pinnate or pinnatifid, sometimes pedate, faces glabrous or pilose to densely hispid; heads borne singly or aggregated in open to congested corymbiform to paniculiform clusters; peduncles 5 mm to 20+ cm long; involucre various, often cylindric-turbinate, ranging to hemispheric or nearly saucer-shaped, mostly 4-12(-20+?) mm high; phyllaries heteromorphic, the outer typically 3, 5, 8, 13, etc., usually green, herbaceous, variously shaped but contrasting in shape, size, and/or texture with the 5, 8, 13, etc., often brownish to purplish or stramineous, sometimes green, commonly striate, membranous, scarious-margined, inner ones, all free or weakly connate at base; receptacles flat to convex; paleae mostly slender, scarious, usually much narrower and shorter than the central cypselae; ray florets commonly 5, 8, 13, etc., usually neuter, sometimes none or styliferous and sterile, rarely pistillate and fertile, corollas mostly yellow to orange or white with darker nerves, sometimes each with a reddish to purple basal spot, rarely purplish to rosaceous or red throughout, laminae mostly oblong to elliptic and showy, sometimes short, suborbicular, and inconspicuous (heads very rarely disciform with peripheral florets pistillate and fertile and corollas very short and tubular); disc florets mostly 12-60(-200+), bisexual, fertile, corollas mostly yellow to orange, rarely reddish to purplish, tubes very slender, shorter and often paler than the dilated, cylindric to campanulate or urceolate throats, lobes (4-5), usually narrowly deltate and erect; stamen filaments glabrous; style-branch appendages variously short- to long-hispidulous; cypselae variable, pale tan to orange, reddish brown, or, commonly, iridescent black, radially flattened to triquetrous or quadrate (then usually with 2-4 grooves in each face), oblong to cuneate, linear, or fusiform in broadest silhouette, sometimes apically attenuate, glabrous or variously hairy, often weakly to strongly tuberculate and antrorsely hispid, sometimes ciliate, rarely somewhat winged; pappi none or of 2(1-8), stout awns or subulate scales, the elements usually retrorsely (rarely antrorsely) barbed or hispid, rarely glabrous; $x = ?$ (10, 11, 12, 17, 18?).

A very complex, widely distributed genus very closely related to *Coreopsis*, *Cosmos*, and *Dahlia*. Sherff (1937) recognized some 185 species; more recent estimates range from 150-250. The greatest concentration of species is in tropics and subtropics of New World; the genus is also

well represented in temperate regions of North America and South America and in Old World, especially Africa and Pacific Basin islands.

Among Chiapan specimens of *Bidens*, I have failed to identify: *D. E. Breedlove 29344* from SE side of summit of Volcán Tacaná at ca. 3600 m, flat meadows and steep slopes with *Pinus*, *Juniperus*, and *Buddleia*. The plants are: annuals; stems 3–5 cm long; leaves ternate or biternate, 5–8(–12) mm long, lobes oblanceolate or spatulate, 1–3 mm long, glabrous or nearly so; heads borne singly; peduncles 1–8 mm long; involucre ± campanulate, 3–5 mm high; outer phyllaries 2–4, herbaceous, spatulate to oblanceolate, nearly glabrous; inner phyllaries 4–5, chartaceous to membranous, ovate to lanceolate, glabrous; ray florets apparently none; disc florets 3–8+, corollas yellow, ca. 1.5 mm long, 4-lobed; cypselae blackish, fusiform, 2–4.5 mm long, the outer shorter; pappi none or 2(1–3), retrorsely barbed awns 0.5–1 mm long.

REFERENCES: MELCHERT, T. E. 1976. *Bidens*. Fieldiana: Bot. [Fl. Guat.] 24(XII):193–214; SHERFF, E. E. 1937. The genus *Bidens*. Field Mus. Nat. Hist., Bot. Ser. 16:1–709; ———. 1955. *Bidens*. In N. L. Britton et al., N. Amer. fl., ser. ii. 2:70–129.

- a. Shrubs or woody vines, stems mostly 2–4(–30) m long; peduncles mostly less than 5 cm long; cypselae usually tuberculate and white ciliate.
 - b. Ray florets none or 3–5+, laminae of corollas 7–12(–19) mm long 11. *B. squarrosa*
 - bb. Ray florets mostly 8, laminae of corollas 18–25+ mm long. 5. *B. holwayi*
- aa. Herbs or, rarely, shrubs, not vines, stems mostly less than 2 m long; if shrubby, peduncles more than 5 cm long; cypselae seldom tuberculate, often hispid, not ciliate.
 - c. Corollas all, or at least the rays, purple to rosaceous; awns of pappi antrorsely hispid 10. *B. rostrata*
 - cc. Corollas yellow to orange or white (sometimes purplish-nerved or spotted); awns of pappi retrorsely barbed or glabrous or none.
 - d. Leaves sessile, not divided, lanceolate, serrate, 6–12 cm long; disc florets 150–200+ 6. *B. laevis*
 - dd. Leaves mostly petiolate, 1–3-pinnate or pinnatifid, rarely not divided (then mostly less than 6 cm long); disc florets mostly 16–60.
 - e. Pappi of 1 erect and 2(–4) squarrose or reflexed awns 9. *B. riparia*
 - ee. Pappi none or of 2–5 awns, all erect or all spreading to divergent.
 - f. Ray corollas each with a reddish to purple spot at base of lamina (look closely) 2. *B. bicolor*
 - ff. Ray corollas lacking a reddish to purplish spot at base of each lamina.
 - g. Leaves often coriaceous; ray florets pistillate, corollas well-developed with showy laminae; all cypselae dull to reddish brown, with 3–8 striae on each of the 2–3 faces 7. *B. ostruthioides*
 - gg. Leaves little, if at all, coriaceous; ray florets neuter or stylerous and sterile or none (very rarely, in some *B. pilosa*, peripheral florets pistillate and fertile with very short, tubular corollas); some or all cypselae iridescent, black, 2-grooved on each of the 3–4 faces.
 - h. Outer phyllaries spreading to reflexed, mostly 7–15 mm long, 1–2 mm wide; inner phyllaries 6–11 mm long 3. *B. chiapensis*
 - hh. Outer phyllaries erect or, if spreading, mostly less than 7 mm long; inner phyllaries mostly 4–7 mm long.
 - i. Peduncles 2–8(–12+) cm long, heads loosely aggregated in corymbiform clusters of mostly 3–5+.
 - j. Perennials (sometimes blooming in first season), usually in wet habitats; ray corollas mostly 12–21-nerved; cypselae of each head 4–5(–7) mm long 1. *B. aurea*
 - jj. Annuals (rarely rooting at proximal nodes and persisting), usually in mesic to dry habitats; ray corollas mostly 5–10(–14)-nerved; largest cypselae of each head 9–12(6–16) mm long. 8. *B. pilosa*
 - ii. Peduncles (8–)12–20+ cm long, heads usually borne singly, sometimes paired.
 - k. Leaves mostly 5–7 cm long overall; ray laminae ca. 15 mm long, 12–14-nerved 4. *B. geraniifolia*
 - kk. Leaves mostly less than 5 cm long; ray laminae mostly 12–25+ mm long, 15–17-nerved 12. *B. triplinervia*

1. *Bidens aurea* (Aiton) Sherff, Bot. Gaz. 59:313. 1915.

- *Coreopsis aurea* Aiton, Hortus Kew. 3:252. 1789. — *Coreopsis trichosperma* Michx. var. *aurea* (Aiton) Nutt., Gen. 2:180. 1818. — *Diodonta aurea* (Aiton) Nutt., Trans. Amer. Philos. Soc., ser. II. 7:360. 1841. — TYPE: Cultivated at Kew, "Introd. 1785, by Charles Earl of Tankerville," source unknown. [Sherff cited a specimen in BM.]
- Bidens heterophylla* Ortega, Nov. pl. descr. dec. 99, t. 12. 1798. — *Coreopsis lucida* Cav., Descr. pl. 224, 615. 1802 [nom. superfl.]. — TYPE: Mexico, "Habitat in Nova Hispania," grown in Madrid, from seed from Sessé (?MA).
- Bidens luxurians* Willd., Enum. pl. hort. Ber. 847. 1809. — *Bidens arguta* Kunth var. *luxurians* (Willd.) DC., Prodr. 5:596. 1836. — TYPE: Mexico, "Habitat in Mexico." Grown in Berlin; specimen destroyed.
- Bidens arguta* Kunth, Nov. gen. sp., ed. fol. 4:181. 1820 [1818]; ed. qto. 4:231. 1820. — TYPE: Mexico, "Crescit locis temperatis, prope Valladolid de Mechoacan, alt. 1000 hex. [1800 m]," Sep, A. von Humboldt and A. J. A. Bonpland s.n. (P, microfiche!).
- Bidens decolorata* Kunth, Nov. gen. sp., ed. fol. 4:182. 1820 [1818]; ed. qto. 4:233. 1820. — TYPE: Mexico, "Crescit inter Capula et Valladolid de Mechoacan, alt. 1070 hex. [1926 m]," Sep, A. von Humboldt and A. J. A. Bonpland s.n. [4315] (P, microfiche!).
- Coreopsis tetragona* Cerv. ex La Llave & Lex., Nov. veg. descr. 1:31. 1824. — *Bidens tetragona* (Cerv. ex La Llave & Lex.) DC., Prodr. 5:596. 1836. — TYPE: Mexico, "in pratis humidis et in defossibus Mexico viciniis. Floret tota aestate," ?*Cervantes s.n.* (G).
- Bidens longifolia* DC., Prodr. 5:597. 1836. — SYNTYPES: Mexico, "in valle Mexicana legit cl. Berlandier (pl. exs. n. 717) et etiam a cl. Alaman recepi." (G-DC, microfiche!).
- Bidens warszewicziana* Regel, Flora 32:183. 1849. — TYPE: Grown in Zurich from seed sent by Warszewicz from "der Gegend von Guatemala" (?Z).
- Bidens heterophylla* Ortega var. *wrightii* A. Gray, Proc. Amer. Acad. Arts 19:16. 1883. — *Bidens aurea* (Aiton) Sherff var. *wrightii* (A. Gray) Sherff, Bot. Gaz. 85:16. 1928. — LECTOTYPE (here designated): Mexico, Sonora, "between the San Pedro and Santa Cruz," Sep, C. Wright s.n. [1233 bis] (GH).

For additional synonymy, see Sherff (1937; 1955).

ILLUSTRATION: Sherff (1937, pl. 130).

Perennial, often rhizomatous, herbs (rarely annual?), 2–8 dm high; leaves petiolate, very variable, simple with rhombic to narrowly lanceolate, serrate to nearly lacinate blades 2–5(1–8) cm long, 8–12 mm wide, or pinnate with 3–5(–7) lobes or leaflets with narrowly to broadly lanceolate blades 1–5(–10+) cm long, 5–12(–22) mm wide, or bipinnatifid into linear to filiform or narrowly lanceolate segments 3–12(2–25+) mm long, 0.8–1.5+ mm wide, all leaf-forms variously glabrescent to densely pubescent; heads very loosely associated in corymbiform clusters of (2)–3–5+; peduncles slender, mostly 6(–12+) cm long; involucre cylindric-turbinate to hemispheric; outer phyllaries 8–15, green, herbaceous, erect, linear to narrowly spatulate, often callous-thickened distally, often white-ciliate, 3–6 mm long; inner phyllaries 8–12, brownish to purplish, membranous with pale stramineous to bright yellow or orange,

translucent margins, glabrous or sparsely pubescent, lance-ovate to lance-linear, often attenuate and papillate-hispidulous, 4–5 mm long; paleae scarious, lance-linear to linear, equalling to exceeding cypselae; ray florets 5–8, neuter, corollas yellow, often paler distally, sometimes pale to white throughout, laminae linear-elliptic to obovate, 9–12+ mm long, 12–21-nerved; disc florets 20–50, corollas yellow to golden orange, sparsely puberulent with multicellular hairs, tubes 1.1–1.3 mm long, throats narrowly campanulate, 2.1–2.8 mm long, lobes stoutly to narrowly deltate 0.4–0.7 mm long; filaments glabrous, anthers purplish brown to black; style-branch appendages deltate to subulate, hispidulous; cypselae mostly blackish, iridescent, the outermost sometimes yellowish to dark brown and stouter than the inner, all somewhat flattened, narrowly cuneate to nearly linear, 4–5(–7) mm long, usually 2-grooved on each face, glabrous or tuberculate-hispid; pappi none or of 1–2 stout, erect to spreading, usually retrorsely barbed awns, mostly 1–2(–3) mm long; $2n = 24, 46$; flowering mostly Jul–Oct.

Usually in wet places in Evergreen Cloud, Pine-Oak-Liquidambar, and Pine-Oak forests; common on Central Plateau, rare in Northern and Eastern highlands and in Sierra Madre; 1300–3000 m. Southwestern U.S. (Ariz.) through much of Mex. (Baja C. S., Son., Chih., Coah., Sin., Dgo., Zac., S.L.P., Nay., Jal., Hgo., Cma., Mich., Méx., D.F., Mlos., Pue., Ver., Oax., Chis.) to Guat. CHIAPAS COLLECTIONS: Calz 9072 (TEX); C&G 575 (CAS); Cro 40440 (CAS); Cru 1537 (UC); Cru 1543 (UC); Cru 1548 (UC); Cru 1549 (UC); GL 72 (CAS); GS 311 (CAS); GS 328 (CAS); RMK 2851 (DS, UC); RMK 2990 (DS, UC); L 985 (DS); L 993 (DS); L 1168 (DS); L 1469 (DS); L 1716 (DS); L s.n., 10 Oct 1966 (DS); L 2491 (DS); Lo 490 (CAS); EM 5881 (CAS, LL); M&L 586 (CAS); SC 194 (CAS); SI 2142 (TEX); SI 2146 (TEX); T 405A (DS); T 1064 (DS); T 1065 (DS, LL); T 1233 (DS); T 9358 (TEX); T 9794 (TEX); Z 278 (DS); 6026; 6841; 6968; 10474; 10894; 10951; 11964; 12155; 12484; 12492; 12638; 12652; 12719; 12791; 13091A; 14154; 14419; 14425; 14426; 14671; 14673; 29198; 37915; 40288; 40896; 40899; 46361; 46362; 46363; 46371; 52598.

2. *Bidens bicolor* Greenm., Proc. Amer. Acad. Arts 39:114. 1903.

— LECTOTYPE (Sherff 1937:536): Mexico, Oaxaca, 1750 m, Jul–Aug 1900, C. Conzatti and V. Gonzalez 1008 (GH). ILLUSTRATION: Sherff (1937, pl. 133).

Erect to spreading annuals (perennials?), mostly 2–8(–20) dm high; leaves 3(–5)-parted, mostly 4–12 cm long overall, leaflets mostly lanceolate to ovate, (1)–2–6 cm long, base cuneate to truncate, margins serrate, apex acute, faces sparsely to densely puberulent or glabrescent; heads loosely associated on slender peduncles 3–8(–18) cm long; involucre broadly campanulate to hemispheric, often white-hairy at base; outer phyllaries mostly 5–8, erect to reflexed, green, herbaceous, linear, mostly 4–10 mm long; inner phyllaries mostly 8, erect, purplish black, membranous with narrow scarious margins, lance-linear, mostly 4–8 mm long; paleae becoming black, very slender, to 10 mm long; ray florets mostly 5, neuter, corollas pale yellow distally, darker yellow proximally, each with a reddish to purple blotch at base of lamina, laminae broadly elliptic, 12–25+ mm long, 12–17-nerved; disc florets 30–50, corollas greenish yellow, often each with a reddish band at base of throat, sparsely

puberulent, tubes 0.5–1.5 mm long, throats funnellform, 2.5–3.5 mm long, lobes 5, deltate to lance-linear, 0.5–1.1 mm long; anthers black to dark purple; style branches hispidulous-dilated with slender appendages 0.3–0.5 mm long beyond the stigmatic lines; cypselae heteromorphic, the outermost yellowish to tan or reddish (rarely black), stout, weakly arcuate, 3–5 mm long, often epappose, the inner cypselae purplish black, iridescent, linear-fusiform, straight or sinusoid, mostly 5–9(–13) mm long; pappi none or of 1–2(–3), yellow to orange, erect, stout, retrorsely barbed awns to 3 mm long; $2n = 24$; flowering mostly Sep–Nov.

Streambanks and wooded slopes in Tropical Rain, Evergreen Cloud, Pine-Oak-*Liquidambar*, and Pine-Oak forests; common on Central Plateau, rare in Northern and Eastern highlands and in Sierra Madre; (300–)1700–3000 m. Southern Mex. (Oax., Chis.), Guat. CHIAPAS COLLECTIONS: *C&L* 574 (CAS); *G* 781 (GH); *L* 2388 (DS); *T* 20 (DS); *T* 501 (DS, LL); *T* 677 (DS, LL); *T* 839 (DS, LL); *T* 981 (DS, LL); *T* 1302 (DS); *T* 1349 (DS); 12501; 12582; 13426; 29226; 34282; 38740; 40436; 40915; 41369; 46154; 46301.

Bidens bicolor may prove to be an unwarranted segregate from *Bidens aurea*.

3. *Bidens chiapensis* Brandegee, Univ. Calif. Publ. Bot. 6:76. 1914.

— TYPE: Mexico, Chiapas, SE Sierra Madre, "Cerro de Boquerón," Oct 1913, *C. A. Purpus* 6945 (UC!).

Bidens feddemana Sherff, Brittonia 16:60. 1964. — TYPE: Mexico, Michoacán, 8–10 km SW of Jiquilpan, Cerro Santa María, ca. 2000 m, 8–9 Aug 1959, *C. Feddema* 204 (MICH; isotype: F).

Bidens mcvaughii Sherff, Brittonia 16:63. 1964. — TYPE: Mexico, Jalisco, Sierra del Tigre, 3 miles [5 km] S of Mazamitla, 2100–2200 m, 16 Sep 1952, *R. McVaugh* 12970 (MICH; isotype: F).

ILLUSTRATION: Sherff (1937, pl. 130, figs. a–i).

Sprawling to erect perennials, mostly herbaceous, sometimes suffrutescent, to 15 dm high; petioles 12–25(–32) mm long, blades mostly 3-partite, leaflet blades rhombic to lanceolate, 25–50(–90) mm long, 12–20(–35) mm wide, margins mostly coarsely serrate, faces glabrous but for veins and margins; heads borne singly to loosely associated on terminal and axillary peduncles 6–12(–20) cm long; involucre broadly turbinate to hemispheric; outer phyllaries 8–13+, green, herbaceous, spreading to reflexed, linear, mostly 7–15 mm long, 1–2 mm wide; inner phyllaries ca. 13, bronzy green to purplish, scarious to membranous, erect, lance-linear to attenuate, 6–11 mm long; paleae scarious, linear; ray florets 8–13, neuter (rays none in pops. N of Chis.), corollas yellow, fading to ochroleucous, hairy at tops of tubes, laminae linear to ovate, 9–15 mm long, ca. 7-nerved; disc florets 30–50, corollas yellow, glabrous, tubes ca. 1.5 mm long, much narrower than the throats, throats cylindric, 2.8–4.3 mm long, lobes 5, deltate to lance-attenuate, ca. 1 mm; anthers black; style branches with subulate, hispidulous appendages 0.7–1.2 mm long; cypselae black, iridescent, slender, sinusoid, strongly curved at top, 9–13 mm long; pappi of 2–3, erect, stout, retrorsely barbed awns to 6 mm long; $2n = 24$; flowering mostly Sep–Dec.

Wooded slopes and moist canyon walls in Montane Rain, Tropical Deciduous, and Pine-Oak forests; uncommon on Cen-

tral Plateau, in Central Depression, and in SE Sierra Madre; 860–2750 m. Southern Mex. (Jal., Gto., Oax., Chis.), Guat. CHIAPAS COLLECTIONS: *C&L* 570 (CAS); *Och* 4278 (CAS); *L* 1851 (DS); *L* 6668 (UC); *L* 6945 (UC); *Sl* 3134 (TEX); *T* 9316 (CAS, TEX); 7990; 12390; 29426; 40477; 41456; 46132; 46345; 46960; 53782; 53880; 55565; 65724.

4. *Bidens geraniifolia* Brandegee, Univ. Calif. Publ. Bot. 6:76. 1914.

— Mexico, Chiapas, "Cerro del Boquerón," Sep 1913, *C. A. Purpus* 6679 (UC!).

ILLUSTRATION: Sherff (1937, pl. 130, figs. j–o).

Perennial(?), 4–? dm high; leaves bipinnatisect, roughly deltate in outline, mostly 5–7 cm long overall, ultimate segments mostly lance-linear, mostly 5–15(–30) mm long, 2–3(–4) mm wide, apex acute or even apiculate, faces glabrous but for ciliate petiole base and scabrellous margins and veins; heads borne singly on terminal or axillary peduncles 12–20 cm long; involucre broadly turbinate to hemispheric; outer phyllaries 8–12+, herbaceous, linear to spatulate, 6–9+ mm long, pungently acute; inner phyllaries ca. 12, membranous with scarious margins, lance-linear, ca. 6 mm long; paleae membranous to scarious, narrowly linear, to ca. 7 mm long; ray florets ca. 8, neuter, corollas pale (yellow or white?), laminae broadly elliptic, ca. 15 mm long, 12–14-nerved; disc florets ca. 40, corollas probably yellow, tubes 0.6–0.9 mm long, throats funnellform, 2.5–3.3 mm long, tubes and adjacent throats sparsely glandular-hairy, lobes 5, lance-deltate, 0.8–1.1 mm long; anthers blackish; style branches hispidulous, subulate-appendaged; cypselae not seen; pappi of 0–2, retrorsely barbed awns.

Chiapas endemic; known only from the type collection (SE Sierra Madre).

The type of *Bidens geraniifolia* may prove to be conspecific with that of *B. chiapensis*.

5. *Bidens holwayi* Sherff & S. F. Blake, Bot. Gaz. 64:39. 1917.

— TYPE: Guatemala, Quezaltenango, 31 Jan 1917, *E. W. D. Holway* 816 (GH).

ILLUSTRATION: Sherff (1937, pl. 53).

Climbing vines, stems often to 20(–30) m long or shrubby and to 35 dm high; leaves pinnate with 3–5 leaflets, rarely simple, mostly 8–15+ cm long overall, leaflet blades lanceolate to ovate, mostly 5–9+ cm long, base cuneate to obliquely truncate, apex attenuate; heads terminal or axillary in corymbiform clusters on stout peduncles mostly 1–5 cm long; involucre cylindric to ovoid; outer phyllaries 5–8+, greenish with 3–5 dark nerves, linear to spatulate, usually ciliolate, 6–9(–14) mm long; inner phyllaries 5–8+, reddish brown to purplish, membranous, scarious-margined, lance-ovate, 7–8+ mm long, somewhat attenuate, apically ciliolate; paleae scarious, slender; ray florets mostly 8, neuter, corollas yellow, tubes hairy, laminae long-ovate to elliptic, mostly 18–25 mm long, 7–9-nerved; disc florets 40–60, corollas yellow with darker nerves, tubes 2.1–2.7 mm long, sparsely hairy, throats cylindric-campanulate, 3.4–3.9 mm long, lobes narrowly deltate, ca. 1 mm long; anthers blackish; style branches minutely hispidulous and subu-

late-appendaged; cypselae black to greenish brown, obcompressed or radially flattened, linear, mostly 12–15 mm long, marginally tuberculate and ciliate; pappi of 2–4, erect to recurved, retrorsely barbed awns 4–7+ mm long.

Only one Chiapan collection seen: SE Sierra Madre, Montane Rain Forest at 2700 m on SE side of Volcán Tacaná, 12 Nov 1972, D. E. Breedlove 29435; otherwise known only from montane forests in SW Guat.; 1500–3500 m.

The type of *Bidens holwayi* may be conspecific with that of *B. squarrosa*.

6. *Bidens laevis* (L.) Britton, Sterns, & Poggenb., Prelim. Cat. 29. 1888.

— *Helianthus laevis* L., Sp. pl. 906. 1753. — TYPE: United States, "Virginia," J. Clayton 195 (BM).

For additional synonymy, see Sherff (1937, 1955).

ILLUSTRATION: Sherff (1937, pl. 73).

Robust annuals (perennials?), to ca. 1 m high, often much branched, stems rooting at proximal nodes; leaves sessile, narrowly lanceolate, mostly 6–12 cm long, margins serrate; heads loosely to closely clustered on terminal and axillary peduncles mostly 2–8 cm long; involucre hemispheric to saucer-shaped; outer phyllaries 5–8, green, herbaceous, spreading to reflexed, linear to ovate, 8–15(–25+) mm long; inner phyllaries mostly 8, greenish to stramineous or purplish, membranous to scarious, erect to spreading, broadly ovate, 10–12+ mm long; paleae lanceolate to linear, often orange-tipped; ray florets mostly 8, neuter, corollas golden yellow, sometimes paler distally, laminae ovate to elliptic, mostly 20–30 mm long, 12–15-nerved; disc florets ca. 150–200+, corollas yellow, tubes 2.1–2.6 mm long, throats cylindric-funnelform, 2.3–3.1 mm long, lobes deltate-ovate, 0.6–0.9 mm long; anthers blackish; style branches hispidulous-dilated and minutely subulate-appendaged; cypselae greenish to purplish black, radially flattened, cuneate in outline, retrorsely barbed along margins and on nerve on inner face, 4–6 mm long; pappi of 2(–4), stout, retrorsely barbed awns 2–5 mm long; $2n = 24$; flowering the year around.

Pond margins, wet pastures, etc.; in Chiapas, known only from valley of San Cristóbal de Las Casas; ca. 2200 m. Widely scattered across U.S. (Calif., Ariz. east and north to N.H., south to Fla.) and through much of Mex. (Son., Chih., Coah., Dgo., Nay., Jal., Mich., Méx., D. F., Oax., Chis.) into S.A., also in Haw. CHIAPAS COLLECTIONS: *L* 86 (DS); *SR* 1071 (CAS); 8320; 10416; 37144.

7. *Bidens ostruthioides* (DC.) Schultz-Bip. in B. C. Seemann, Bot. voy. *Herald* 308. 1856.

— *Delucia ostruthioides* DC., Prodr. 5:633. 1836. — LECTOTYPE (Sherff 1937:532): Mexico, Distrito Federal, mountains about Mexico City, 22 Sep 1827, J. L. Berlandier 920 (G-DC, microfiche!; isotypes: BM, FI, G, P, W).

Bidens costaricensis Benth., Vidensk. Meddl. Dansk Naturhist. Foren. Kjøbenhavn 4[1852]:94. 1853. — *Bidens ostruthioides* (DC.) Schultz-Bip. var. *costaricensis* (Benth.) Sherff, Bot. Gaz. 88:298. 1929. — LECTOTYPE (Sherff 1937:299): Costa Rica, Mt. Aguacate, Nov 1846, A. S. Oersted s.n. (C).

Bidens guatemalensis Klatt, Bot. Jahrb. Syst. 8:44. 1887. — TYPE: Guatemala, San Marcos, 16 Jun 1882, F. C. Lehmann 1560 (G; isotypes: GH, K, US).

Bidens irazuensis A. C. Calvert & Calvert, Year Costa Rican Nat. Hist. 140. 1917. — TYPE: Costa Rica, Volcán Irazú, 2 Apr 1910, Calvert and Calvert s.n. (PENN).

Bidens ostruthioides (DC.) Schultz-Bip. var. *matritensis* Sherff, Amer. J. Bot. 38:66. 1951. — TYPE: Guatemala, San Marcos, Volcán Tacaná, near San Rafael, 2500–3000 m, 20 Feb 1940, J. Steyermark 36165 (F).

ILLUSTRATIONS: Sherff (1937, pls. 131 and 132).

Sprawling to erect herbs or suffrutescent, stems to 1(–2) m long; leaves variable, often coriaceous, simple to 3(–5)-lobed, blades ovate to rhombic or subdeltate, 3–8+ cm long overall, lobes 1–5+ cm long, 1–3 cm wide, margins very coarsely toothed, or leaves bipinnatifid, 3–6 cm long overall, ultimate segments lance-linear to cuneate-acute, mostly 3–10 mm long, 1–3 mm wide (such plants often segregated as var. *costaricensis*); heads mostly borne singly on peduncles 5–15+ cm long; involucre broadly turbinate; outer phyllaries mostly 5(–7), green, herbaceous to fleshy, erect, ovate to spatulate or lance-linear, mostly 6–15+ mm long; inner phyllaries 5–8, reddish brown to purplish, membranous, lance-linear to ovate, narrowly scarious-margined, mostly 7–10 mm long; paleae translucent-stramineous to orange or yellowish at tip, scarious; ray florets 5–8, pistillate, corollas yellow, tubes hairy, laminae obovate to elliptic, 18–27 mm long, 12–18-nerved; disc florets ca. 20–50+, corollas brownish yellow proximally, golden yellow distally, tubes very slender, 1.5–2.7 mm long, throats narrowly cylindric to campanulate, 2.8–3.5 mm long, lobes narrowly deltate, often reflexed, 0.8–1.5 mm long, sparsely hairy abaxially; anthers purplish black; style branches hispidulous-dilated, appendages very short, deltate; cypselae dull brown (café au lait) to reddish brown, radially flattened, the outer triquetrous, all stoutly cuneate to nearly fusiform or linear in face view, obscurely 3–8-striate on each face, 9–10+ mm long; pappi of 2(–3), slender, retrorsely barbed awns 3–5 mm long; $2n = 46$; flowering mostly Aug–Jan.

Rocky, wooded, often moist, slopes in Montane Rain, Evergreen Cloud, and Pine-Oak forests; common on Central Plateau and in SE Sierra Madre; 1650–3600 m. Southern Mex. (Sin., Jal., Mich., Méx., D.F., Mlos., Pue., Ver., Oax., Chis.), Guat., C.R. CHIAPAS COLLECTIONS: *Cru* 1210 (DS, LL, TEX, UC); *Gar* 304 (TEX); *G* 107 (GH); *G* 151 (P); *G* 555 (BM, MO); *GL* 334 (CAS); *GE* 1254 (TEX); *L* 117 (DS); *L* 490 (DS); *L* 1804 (DS); *EM* 795 (LL); *EM* 4620 (LL); *Och* 4393 (CAS); *SR* 55 (CAS); *SR* 455 (CAS); *SR* 942 (CAS, TEX); *SI* 2321 (TEX); *SI* 3109 (CAS, TEX); *SI* 3127 (TEX); 7976; 8300; 15129; 22607; 24299; 25806; 29403; 37331; 41318; 46248.

Presence of pistillate, fertile ray florets, novel cypselae morphology, and unusual chemistry (fide Melchert) combine to suggest that *Bidens ostruthioides* might better be excluded from *Bidens*, perhaps in a monotypic genus for which the name *Delucia* DC. is available.

8. *Bidens pilosa* L., Sp. pl. 832. 1753.

— TYPE: Unclear; perhaps the Dillenian figure cited in the protologue. Application of the name here is in keeping with tradition.

Synonymy for this "complex" is great and complicated; some 60 basionyms are variously combined and recombined at ranks sp., subsp., var., and f. See Sherff (1937), Melchert (1976), and note following.

ILLUSTRATIONS: Sherff (1937, pls. 102, 103, 104, 106, 108, and 109).

Annuals (sometimes rooting at proximal nodes and persisting), mostly 3–12(1–25+) dm high; leaves various, simple to 3-pinnatisect, mostly pinnate, 3–5+-foliate, rarely simple, individual blades mostly lanceolate to ovate, mostly 3–7(–12) cm long, 12–18(–45) mm wide, margins subentire to coarsely serrate, apex acuminate, faces variously hairy, sometimes glabrescent (plants mostly 12–35 cm high with 2–3-pinnatifid leaves, 2–7 cm long overall, and rather stout, 0–2-awned cypselae, common on Central Plateau, have been segregated as *B. odorata*); heads loosely clustered on terminal and axillary peduncles mostly 2–7+ cm long; involucre narrowly cylindric-turbinate to campanulate or hemispheric; outer phyllaries 6–8(–13), green, erect, herbaceous, linear-subulate to spatulate, mostly 3–5 mm long, variously hairy to glabrescent, often ciliolate; inner phyllaries 8–13, greenish to brown or purple, membranous, lanceolate to ovate, mostly 4–8 mm long, usually glabrous, rarely with multicellular hairs, commonly scarious-margined; paleae linear, scarious, shorter than central cypselae; ray florets none or 4–9, typically neuter, rarely styliferous, then sterile, heads very rarely disciform (peripheral florets pistillate and fertile and corollas very short, tubular), ray corollas usually white to pale yellow, sometimes pinkish to purplish, with 5–10(–14), often purplish, nerves, laminae quite short (3–6 mm) and cuneate to linear-elliptic or strap-shaped, 6–15(–20+) mm long (robust plants with 1-pinnate leaves, spatulate outer phyllaries, and rather large, white ray corollas have been segregated as *B. alba* var. *radiata*); disc florets mostly 20–60(–80+), corollas yellow, 3–5 mm long, tubes very slender, 0.7–1.2 mm long, throats ampliate, cylindric to narrowly funnelform, sometimes puberulent, (1.5–)2.5–3.2 mm long, lobes 5, narrowly delatate, 0.6–0.8 mm long, sometimes pubescent with multicellular hairs; anthers mostly blackish; style branches hispidulous-dilated and appendaged beyond the stigmas; cypselae monomorphic or heteromorphic, sometimes the peripheral ones dull yellow to reddish, much flattened, cuneate, and only 3–6 mm long, otherwise all (or central only, when heteromorphic) black, iridescent, quadrate to flattened, linear to weakly clavate or fusiform, often apically attenuate, straight to arcuate, usually 2-grooved on each face, glabrous or sparsely hairy, especially distally, sometimes warty, the longest, innermost ones mostly 9–12(6–16) mm long; pappi none or of 2–3(–5), erect to divergent, usually retrorsely barbed awns mostly 2–3 mm long; $2n = 24, 48, 72$; flowering mostly Jul–Dec.

Mostly ruderal along roads, trails, and streams, in pastures, about habitations, etc., in Evergreen Cloud, Evergreen Seasonal, Pine-Oak-Liquidambar, and Pine-Oak forests; very common on Central Plateau, less so in Northern Highlands and Central Depression, rare in Sierra Madre, to be expected most anywhere in the state; 1600–2200(100–2850) m. Now circumtropical and extending well into subtropics, apparently native in southern Mex., C.A., Antill., and N.S.A. CHIAPAS COLLECTIONS: *Brooks 63-1* (TEX); *Calz 3468* (TEX); *C&L 593* (CAS); *C 259* (DS); *C 497* (CAS); *Cro 64897* (CAS); *Glies CH-37* (CAS); *GS 402* (CAS, TEX); *GG 467* (CAS); *He 508* (CAS, TEX); *RMK 2774* (DS, TEX, UC); *RMK 2864* (DS,

TEX, UC); *RMK 3093* (UC); *Lan 807* (TEX); *Lan 809* (TEX); *L 104* (DS); *L 104A* (DS); *L 329* (DS); *L 978* (DS); *L 1194* (DS); *L 1430* (DS); *L 1431* (DS); *L 1472* (DS); *L 1788* (DS); *L 2040* (DS); *L 2070* (DS); *L 2368* (DS); *L 2492* (DS); *Lo 679* (CAS); *Mz 10163* (TEX); *EM 5892* (CAS, LL); *Mel 71-139* (TEX); *Mel 71-141* (TEX); *Mel 71-152* (TEX); *Mel 71-158* (TEX); *Neff 93-4-10-10* (TEX); *Neff 93-4-11-7* (TEX); *Neff 93-4-18-2* (TEX); *Och 4313* (CAS); *Prat 1119* (TEX); *R 19831* (DS); *R 20130* (DS); *R&R&M 996* (LL); *Sau 22* (LL); *SC 20* (TEX); *SC 784* (CAS); *SR 679* (CAS); *SI 2083* (TEX); *SI 2087* (TEX); *SI 2101* (TEX); *SI 2141* (TEX); *SI 2143* (TEX); *SI 2949* (TEX); *Spo 2779* (TEX); *RT 41532* (DS); *T 24* (DS); *T 457* (DS, LL); *T 543* (DS, LL); *T 633* (DS, LL); *T 1098* (DS, LL); *T 1233* (DS); *T 4779* (CAS); *T 9359* (TEX); *BLT 15446* (TEX); *BLT 15453* (TEX); *Vaz 1100* (TEX); *Ve 2647* (CAS); *Z 4* (LL); *Z 248* (DS); *6129*; *6478*; *7791*; *7973*; *9108*; *11912*; *12008*; *12325*; *12507*; *13304*; *14420*; *20036*; *20172*; *22924*; *28701*; *33818*; *37493*; *39760*; *39765*; *40917*; *42823*; *41881*; *42541*; *46138*; *46812*; *52196*; *53143*; *54867*; *70463*.

The *Bidens pilosa* "complex" has been variously treated by several authors (e.g., Sherff 1937; Melchert 1976). Principal characters used in circumscribing segregates and infraspecific taxa have included: leaf morphology, number and form of outer phyllaries, number of ray florets, color and size of ray corollas, number of awns per cypselae, and cypselae morphology, especially mono- vs. di-morphic cypselae. Among collections I have seen, certain combinations of the various expressions of these characters are much more common than others, i.e., most plants are referable to one or another of a few major facies of the "complex." But, there remain numerous specimens that cannot be referred to any of the major facies; nearly every one of the large number of potential combinations of characteristics is represented by at least a few specimens, often from seemingly randomly scattered localities. Further, although the major facies do show some geographic coherence, there are numerous collections that document regular or sporadic occurrence of each in localities well beyond its primary "range." So far, I have been unable to discover, either published or from my own observations, a satisfactory partitioning of the "complex." For comparison, I note that *Bidens pilosa* as treated here includes, as nearly as I can tell, the following "taxa" recognized by Melchert (1976): *B. alba* (L.) DC. var. *radiata* (Schultz-Bip.) Ballard, *B. bigelovii* A. Gray var. *angustiloba* (DC.) Ballard, *B. odorata* Cav. (incl. vars. *rosea* (Schultz-Bip.) Melchert and *odorata*), and *B. pilosa* L. (incl. vars. *minor* (Blume) Sherff and *pilosa*). A third interpretation may be found in Sherff's last treatment of this group (1955). In the narrowest sense in common use, *B. pilosa* refers to plants with simple to 1-pinnate leaves, discoid heads, monomorphic cypselae, and pappi of 3(2–5), stout awns. Two other, more-or-less distinctive segregates are diagnosed parenthetically in the above description.

Tentatively included here in *B. pilosa* are: *D. E. Breedlove 13374*, *13813*, *29387*, *38381*, *41208*, *46057*, *46295*, and *46535* and *Ramirez-Marcial et al. 543* (CAS). Some of these may represent taxa other than *B.*

pilosa or hybrids involving *B. pilosa* and some other species of *Bidens*.

9. *Bidens riparia* Kunth, Nov. gen. sp., ed. fol. 4:185. 1820 [1818]; ed. qto. 4:236. 1820.

— TYPE: Colombia, bank of Magdalena River near Badillas, May 1801, *A. von Humboldt and A. J. A. Bonpland s.n.* (P, microfiche!).

Bidens refracta Brandegee, Zoe 1:130. 1890. — *Bidens riparia* Kunth var. *refracta* (Brandegee) O. E. Schulz in I. Urban, Symb. antill. 7:132. 1911. — TYPE: Mexico, Baja California Sur, near Miraflores, 13 Oct 1890, *T. S. Brandegee* 319. (UC!).

Bidens ambrosioides Willd. ex O. E. Schulz in I. Urban, Symb. antill. 7:132. 1911. — TYPE: Based on same material as *B. riparia* Kunth (fragments at B, "Willd. herb. 15031 fol. 1" fide Sherff, 1937).

ILLUSTRATION: Sherff (1937, pl. 114).

Erect annuals, to 15 dm high; leaves 1(–2)-pinnate with 3–5(–9) leaflets, mostly 4–12(–18) cm long overall, leaflet blades narrowly deltate to rhombic, mostly 2–8(–12) cm long, base attenuate, margins serrate, faces sparsely puberulent, at least on veins and margins; heads inconspicuous at anthesis, scattered on terminal and axillary peduncles mostly 4–10 cm long (in fruit); involucre cylindric-turbinate, white-hairy at base; outer phyllaries mostly 8(–13), green, herbaceous, erect to reflexed, linear, 4–6(–10) mm long; inner phyllaries 8–13, purplish to blackish green, membranous with scarious margins, erect, lance-linear, mostly 3–4+ mm long; paleae purplish, linear, scarious, to 6+ mm long; ray florets 5 (rarely 0?), neuter, corollas pale yellow, fading to ochroleucous or white, laminae ovate to spatulate, 4–6 mm long, 5-nerved; disc florets mostly 15–30, corollas yellow with purplish nerves, glabrous, tubes 0.7–1.1 mm long, throats narrowly cylindric, 1.3–1.7 mm long, lobes deltate, 0.7–0.9 mm long, apically thickened; anthers reddish brown to blackish; style branches blackish (dry), minutely reddish-hispidulous distally; cypselae weakly dimorphic, the outer usually dark or reddish brown, densely antrorsely puberulent to hispid, 9–15 mm long, the inner greenish to tan or stramineous, usually glabrescent toward base, mostly 12–23 mm long, all very slender, straight or slightly curved; pappi of 3–5, stout, retrorsely barbed awns, 1 nearly erect, the others squarrose to reflexed, mostly 2–4 mm long; $2n = 24$; flowering Sep–Nov.

Streambanks and brushy slopes, often ruderal, in Evergreen Seasonal and Tropical Deciduous forests; uncommon in Northern Highlands, in Central Depression, and on Pacific Coastal Plain; 500–800 m. Common at lower elevations on both coasts of Mex. (Baja C., Son., Sin., Nay., Jal., Cma., Méx., Ver., Gro., Yuc., Chis.), Guat., Nic., C.R., Pan.; N S.A.; Galapagos Is. CHIAPAS COLLECTIONS: *EM* 18695 (DS, TEX); *T* 3167 (DS); 20369; 28062; 38461; 46089; 46117; 46428; 46504; 54419.

10. *Bidens rostrata* Melchert, Phytologia 32:291. 1975.

— *Cosmos exiguus* A. Gray ex S. Watson, Proc. Amer. Acad. Arts 22: 429. 1887 [non *Bidens exigua* Sherff]. — TYPE: Mexico, Jalisco, 10 miles [16 km] northwest of Guadalajara, Rio Blanco, Sep 1886, *E. Palmer s.n.* [559] (GH)

ILLUSTRATION: none found.

Slender, erect, rather delicate annuals, mostly 2–6+ dm high, often glaucous; leaves linear, 2–9+ cm long, 1–2(–3+) mm wide, margins entire or, sometimes, with very few remote teeth, faces glabrous; heads scattered at ends of branches; peduncles very slender, naked or bracteolate, mostly 5–10 cm long; involucre narrowly turbinate to cylindric, 5–6 mm high, crisped-hairy at base; outer phyllaries 5, lance-deltate to subulate, 1–3 mm long; inner phyllaries 5, elongate, lance-ovate, membranous with scarious margins, ca. 5 mm long; paleae similar to inner phyllaries, to ca. 7 mm long; ray florets 5, neuter, corollas purple to rosaceous with 5 darker nerves, laminae obovate to cuneate, mostly 3–5 mm long, apically 2–3-lobed (like a funnelform-campanulate corolla opened along the adaxial face; disc florets ca. 15, corollas translucent to white, sometimes pink to rosy (rarely yellow) distally, 4.5–5.5 mm long, bilabiate with 3 abaxial and 2 adaxial lobes, tubes very slender, 0.7–1.1 mm long, throats funnelform, weakly dilated, lobes narrowly deltate to deltate-ovate; filaments not hairy, minutely papillate just beneath the collar, anthers purplish black; style branches minutely hispidulous with subulate appendages; cypselae dark brown to black proximally, tawny distally, very slender, somewhat flattened and attenuate apically, 15–19 mm long, antrorsely hispid, especially distally; pappi of 2, erect, antrorsely hispid awns 2–4 mm long; $2n = 24$; flowering Oct–Nov.

Rocky slopes in Pine-Oak Forests; uncommon on Central Plateau and rare in Sierra Madre; 900–1200 m. Mex. (Chih., Sin., Nay., Jal., Mich., Méx., Gro., Chis.), Guat. CHIAPAS COLLECTIONS: *Crq* 10468 (DS, TEX); 13812; 38577; 41180; 46528; 53919; 71058.

I readily accept Melchert's removal of *Cosmos exiguus* from *Cosmos*. I question placing it in *Bidens*. It seems almost as aberrant in *Bidens* as in *Cosmos*.

11. *Bidens squarrosa* Kunth, Nov. gen. sp., ed. fol. 4:187. 1820 [1818]; ed. qto. 4:238. 1820.

— TYPE: Venezuela, between Caracas and Mt. Buena-vista, *A. von Humboldt and A. J. A. Bonpland s.n.* (P, microfiche!).

For synonymy and comments on circumscription, see Melchert (1976). For the liberal circumscription adopted here, names applied to Chiapan plants by R. R. Roseman (Phytologia 69:177–188. 1990.) evidently also belong in synonymy here.

ILLUSTRATIONS: Fig. 6; Sherff (1937, pls. 44, 45).

Scrambling vines or shrubs, to 3+ m high; leaves simple to pinnate with 3–5(–7) leaflets, 5–8(–15) cm long overall, blades mostly lanceolate to ovate, sometimes deltate, mostly 2–9 cm long, base truncate to cuneate, margins serrate, apex usually attenuate, faces densely pubescent or glabrous; heads in tight to loose corymbiform or paniculiform clusters at ends of main and axillary branches; peduncles mostly 1–3+ cm long; involucre

narrowly turbinate to cylindric; outer phyllaries 5–8, herbaceous, linear to spatulate, glabrous or densely pubescent, mostly 3–4 mm long; inner phyllaries mostly 8–12, reddish brown to green with dark lines, lance-linear, mostly 5–6 mm long, narrowly scarious-margined; paleae scarious, linear-attenuate; ray florets 0, 3–5+, neuter, corollas bright to pale yellow (rarely white?) fading to ochroleucous, laminae linear to narrowly elliptic, mostly 7–12(–19) mm long, 7–9-nerved; disc florets 15–25, corollas yellow with dark nerves, tubes very narrow, 1.1–1.8 mm long, throats funnelform, 2.9–3.8 mm long, glabrous or sparsely hairy at base, lobes 5, lance-deltate, 0.5–0.9 mm long; anthers black to brown; style branches rather long, minutely hispidulous and subulate-appendaged; cypselae black and iridescent to dull greenish brown, radially flattened, linear and often curved, mostly 5–8(–12) mm long, marginally tuberculate and antrorsely ciliate; pappi of 2, erect to spreading or recurved, smooth or minutely retrorsely (rarely antrorsely) barbed awns to 4 mm long; $2n = 24, 48$; flowering mostly Oct–Dec.

12. *Bidens triplinervia* Kunth, Nov. gen. sp., ed. fol. 4:182. 1820 [1818]; ed. qto. 4:231. 1820.

— TYPE: Mexico, México, near San Agustín de Las Cuevas and Mexico City, 2106 m, 1803–1804, *A. von Humboldt and A. J. A. Bonpland s.n.* (P, *vide* Sherff, 1937). For accounts of the extensive and complex synonymy, see Sherff (1937) and Melchert (1976). The circumscription adopted here apparently includes *Bidens chrysanthemifolia* *sensu* Melchert (1976).

ILLUSTRATIONS: Sherff (1937, pls. 126, 127, 128).

Sprawling, decumbent to ascending perennials with slender stems mostly 3–6 dm long, glabrous or puberulent to canescent, sometimes rooting at proximal nodes; leaves very variable, in Chis. mostly bipinnatifid, 1–3(–5+) cm long overall with ultimate divisions linear to narrowly oblanceolate, 2–5(–10) mm long, 0.5–2+ mm wide, sometimes simple or with 3 leaflets, the leaflet blades rhombic to lanceolate, 1–3 cm long, ca. 1 cm wide, margins serrate; heads mostly borne singly on terminal or

axillary peduncles mostly 8–20 cm long; involucre mostly broadly campanulate to hemispheric; outer phyllaries mostly 8–13, herbaceous, erect, linear to narrowly spatulate, nearly glabrous to densely white-pubescent, 3–6(–10) mm long; inner phyllaries mostly 13, dark brownish green to purplish, membranous, scarious-margined, lance-ovate to lance-linear, glabrous or pubescent, mostly 5–7 mm long; paleae often orange or black at tip, membranous to scarious, linear-attenuate to filiform, 6–7+ mm long; ray florets 5–8+, neuter, corollas yellow (rarely white), tubes hairy, laminae often paler distally, broadly ovate-elliptic, narrowed apically, 13–25+ mm long, 15–17-nerved; disc florets ca. 40–60, corollas pale yellow to buffy proximally, often golden yellow to orange distally, tubes very slender, 0.8–1.3 mm long, throats narrowly funnelform, sparsely hairy at base or glabrous, 2.5–3.5 mm long, lobes 5, deltate to attenuate, 0.6–0.9 mm long; anthers blackish; style branches hispidulous-dilated proximal to the minute, subulate appendages; cypselae sometimes heteromorphic, the outer dull tan to reddish brown, weakly clavate and flattened, 3–5 mm long, the inner dark brown to blackish, often iridescent, linear to weakly fusiform, 6–9+ mm long, all 2-grooved on each face, glabrous; pappi of 2(–3), erect, often orange, retrorsely barbed awns mostly 1.5–3+ mm long (often shorter or none on outer cypselae); $2n = 24, 48, 72$; flowering mostly Aug–Dec.

Rocky or wooded slopes and wet meadows in Evergreen Cloud, Pine-Oak-*Liquidambar*, and Pine Oak forests; common on Central Plateau, rare in Northern Highlands and SE Sierra Madre; 1676–3600 m. Widespread and common, especially at middle and upper elevations in Mex. (Chih., N.L., S. L. P., Jal., Hgo., Mich., Méx., D.F., Pue., Ver., Gro., Oax., Chis.), through C.A.; S.A. (Col., Ven., Ecu., Peru, Bol., Arg., Chile); apparently naturalized in India. CHIAPAS COLLECTIONS: *C&L* 571 (CAS); *Cro* 47275 (MO, UC); *G* 85 (GH, P); *G* 533 (BM, G, GH, MO); *G* 534 (GH); *EM* 38600 (DS); *L* 70 (DS); *SR* 931 (TEX); *Sund* 2436 (TEX); *T* 988 (DS, LL); *T* 1305 (DS); *T* 1345 (DS); *T* 2355 (DS); *W&R* 252 (TEX); 6811; 6849; 6858; 7977; 8004; 12359; 12577; 12643; 12934; 13303; 14032; 25821; 29222; 29361; 29400; 41365; 46241–46246; 46271.

9. CALEA

Calea L., Sp. pl. ed. 2. 2:1179. 1763. — LECTOTYPE (R. Brown 1817. Trans. Linn. Soc. London 12:108–109): *Santolina jamaicensis* L. = *Calea jamaicensis* (L.) L.

Caleacte R. Br., Trans. Linn. Soc. London 12:109. 1817. — TYPE: not designated; Brown's *Caleacte* included two species: *Caleacte urticifolia* (Mill.) R. Br., from Mexico ("found by Houston near Vera Cruz") and *Caleacte pinnatifida* R. Br. ("lately sent from Brazil by Mr. Sellow").

Tonalanthus Brandegee, Univ. Calif. Publ. Bot. 6:75. 1911. — TYPE: *Tonalanthus aurantiacus* Brandegee = *Calea megacephala* B. L. Rob. & Greenm.

For fuller synonymy, see Wussow et al. (1985).

Mostly shrubs, to 3 m high, sometimes scandent or herbaceous; leaves opposite, rarely whorled or mostly basal, subsessile or petiolate, blades mostly deltate-ovate, sometimes lanceolate to linear, 3(–5)-nerved from near their bases, margins usually serrate to dentate or crenate, abaxial faces usually dotted with resin globules and variously piloso-tomentose to villous, sometimes glabrate; heads in terminal and axillary umbelliform clusters or borne singly; involucre cylindric-campanulate to hemispheric, 5–10(–22) mm high; phyllaries 12–24, usually strongly graduate in 2–6 series, the outer often herbaceous, the inner more chartaceous or scarious, usually stramineous, sometimes reddish, variously ovate to oblong or lanceolate; receptacles convex to narrowly conic; paleae stramineous, chartaceous to scarious, navicular to conduplicate, apically obtuse and erose to obscurely trifid or acuminate; ray florets none or 3–25, pistillate, fertile, corollas ochroleucous, yellow, or orange, glabrous or dotted with resin globules, tubes slender, laminae inconspicuous and narrowly ovate to showy and oblong; disc florets 6–60(–80), bisexual,

fertile, corollas ochroleucous, yellow, or orange, glabrous or variously dotted with resin globules, tubes slender, equal to or longer than throats, often basally dilated and of coarser texture than throats and lobes, throats narrowly cylindric-funnelform to broadly campanulate, lobes 5, lance-deltate to lance-linear; style branches slender, abruptly penicillate; cypselae blackish to purplish, obscurely terete to prismatic, usually somewhat flattened, variously hispidulous or glabrous, sometimes dotted with resin globules, carpodia often well-developed; pappi of 8–25, persistent, subequal, uniseriate or obscurely biseriate, spatulate to subulate squamellae; $x = 19$.

A Neotropical genus of 50(–100?) species; representatives range from Mexico through Central America and the Caribbean to South America; one species is adventive in Africa.

REFERENCE: WUSSOW, J. R., L. H. URBATSCH, and G. A. SULLIVAN. 1985. *Calea* (Asteraceae) in Mexico, Central America, and Jamaica. Syst. Bot. 10:241–267.

- a. Heads discoid.
 - b. Peduncles 2–4(–7) cm long; involucre hemispheric, 8–10 mm high; phyllaries mostly 12–16+, subequal in 2–3 series; florets mostly 50–80+ per head 3. *C. longipedicellata*
 - bb. Peduncles 2–20 mm long; involucre cylindric-campanulate, 5–8 mm high; phyllaries mostly 15–24, strongly graduated in 3–6 series; florets mostly 8–25(–40) per head.
 - c. Corollas ochroleucous to pale (rarely bright) yellow; pappi of 8–12(–16), lanceolate to spatulate squamellae 0.5–2 mm long 5. *C. ternifolia*
 - cc. Corollas bright yellow, often with orange nerves; pappi of 22–28, lance-subulate squamellae 4–5(–6) mm long. 2. *C. jamaicensis*
- aa. Heads radiate.
 - d. Herbs; heads borne singly; peduncles 20–50+ cm long; involucre 16–22 mm high 4. *C. megacephala*
 - dd. Shrubs; heads in umbelliform clusters of (1–)5–15; peduncles 2–30 mm long; involucre 5–10 mm high.
 - e. Corollas ochroleucous to pale (rarely bright) yellow; laminae of ray corollas 1–2(–3) mm long; disc florets mostly 6–15(–20) per head 5. *C. ternifolia*
 - ee. Corollas pale to bright yellow, often with orange nerves; laminae of ray corollas mostly 3–10 mm long; disc florets mostly 15–25(–40+) per head.
 - f. Heads 3–8+ per “umbell”; peduncles 6–15(–30) mm long; pappi of 12–18(–22), lanceolate to lance-subulate squamellae 2.5–4.5 mm long. 6. *C. urticifolia*
 - ff. Heads 1–4 per “umbell”; peduncles 2–8 mm long; pappi of 16–20, lanceolate to oblanceolate squamellae ca. 2 mm long 1. *C. crocinervosa*

1. *Calea crocinervosa* Wussow, Urbatsch, & G. A. Sullivan, Syst. Bot. 10:247. 1985.

— TYPE: Mexico, Chiapas, 10 km east of Arriaga on route 200, 30 m, 31 Oct 1981, D. E. Breedlove 54237 (CAS!, not UC as indicated in protologue; isotype: LSU!).

ILLUSTRATION: Syst. Bot. 10:249. 1985.

Shrubs, to ca. 1 m high; young stems piloso-tomentose; leaves opposite, petioles 1–3 mm long, blades ovate-deltate to broadly rounded-deltate, 2–5 cm long, 1.5–6 cm wide, bases broadly cuneate to truncate, margins coarsely crenate with rounded, almost lobular teeth, apices obtuse to rounded, abaxial faces densely dotted with resin globules and closely villous, at least on the pronounced nerves, adaxial faces sparsely scabrelous to glabrate; heads in terminal and axillary aggregations of 1–4; peduncles 2–8 mm long; involucre roughly hemispheric, 7–10 mm high; phyllaries 16–20, the outer 3–5+ greenish, herbaceous, broadly ovate to oblong, as long as or longer than the inner, indument as on leaves, the inner phyllaries more stramineous, chartaceous to scarious, at least distally, lance-ovate to lanceolate, less hairy, some dotted with resin globules; receptacles convex; paleae golden-stramineous with orange, pellucid nerves, oblong to lanceolate, ca. 6 mm long, navicular to conduplicate, the inner more acuminate to obscurely trifid with a subulate middle lobe; ray florets ca. 8, corollas yellow, tubes ca. 2.5 mm long, laminae oblong to obovate, ca. 4.5 mm

long, abaxially dotted with resin globules; disc florets ca. 20–25, corollas yellow with orange nerves, tubes ca. 1.5 mm long, glabrous, throats narrowly funnelform to campanulate, ca. 1.8 mm long, lobes lance-linear, ca. 1.5 mm long, throats and lobes dotted with resin globules; style branches ca. 1.8 mm long, abruptly penicillate; cypselae (immature) obscurely pyramidal or flattened, ca. 2 mm long including a stipiform carpodium, closely piloso-hispidulous and dotted with resin globules; pappi of 16–20, whitish, subequal, lanceolate to oblanceolate, erose squamellae ca. 2 mm long; flowering Oct.

Chiapas endemic: Savanna with *Acacia* and *Byrsonima* on Pacific Coastal Plain; ca. 30 m. CHIAPAS COLLECTION: 54237 (type).

2. *Calea jamaicensis* (L.) L., Sp. pl. ed. 2. 2:1179. 1763.

— *Santolina jamaicensis* L., Amoen. acad. 5:404. 1760.

— *Calea trifida* Moench, Methodus 581. 1794 [nom. superfl.]. — TYPE: Jamaica, P. Browne s.n. (LINN, no. 984.1).

Calea cordifolia Sw., Fl. Ind. occid. 3:1326. 1806. — TYPE: Jamaica, O. Swartz s.n. (BM).

Calea prunifolia Kunth, Nov. gen. sp., ed. fol. 4:231. 1820 [1818]; ed. qto. 4:294. 1820. — TYPE: Colombia, Magdalena, banks of Río Magdalena, near Honda, 140 hex

- [252 m], Jun–Sep 1801, *A. von Humboldt and A. J. A. Bonpland s.n.* (P; isotypes: B(lost), F, P).
- Calea berteriana* DC., Prodr. 5:672. 1836. — TYPE: Colombia, “Sanctam-Martham,” 1822, *C. G. L. Bertero s.n.* (G-DC).
- Calea collina* Klatt, Leopoldina 20:95. 1884. — TYPE: “Colombia, prope Upata,” *E. Otto 991* (GH; isotypes: B(lost), K).
- Calea trichotoma* Donn.Sm., Bot. Gaz. 13:299. 1888. — TYPE: Guatemala, Alta Verapaz, near Cobán, 4300 ft. [1312 m], Aug 1887, *H. von Tuerckheim 1353* (US; isotypes: F, GH, K, NY).
- Calea pittieri* B. L. Rob. & Greenm., Proc. Boston Soc. Nat. Hist. 29:105. 1899. — LECTOTYPE (Wussow et al. 1985:259): Costa Rica, banks of Río Ceibo near Buenos Aires, 200 m, Jan 1892, *H. Pittier 4913* (GH).
- Calea peckii* B. L. Rob., Proc. Amer. Acad. Arts 44:624. 1909. — TYPE: Belize (as British Honduras), near Manatee Lagoon, 16 Jul 1905, *M. E. Peck 64* (GH; isotype: NY).
- Calea holtonii* Rusby, Descr. S. Amer. pl. 156. 1920. — TYPE: Colombia, Campo, 5 miles [8 km] E of Bonda, below 3000 ft. [915 m], Sep–Oct 1898–1899, *H. H. Smith 524* (NY; isotypes: F, GH, LL, MICH, MO, UC, US).
- Calea jamaicensis* (L.) L. var. *parvifolia* S. Moore, J. Bot. 67:130. 1929. — LECTOTYPE (Wussow et al. 1985:259): Jamaica, St. Andrew Parish, Cane River Valley, 18 Dec 1907, *W. Harris 10064* (UCW); isoelectotypes F, NY, US).
- Calea chocoensis* Cuatrec., Revista Acad. Colomb. Ci. Exact. 9:233. 1954. — TYPE: Colombia, Choco, Nuqui, sea cliffs, 21 Jan 1947, *O. Haught 5455* (US).
- ILLUSTRATION: Ann. Missouri Bot. Gard. 62:1202. 1975; as *Calea prunifolia* Kunth.

Shrubs or suffrutices, sometimes sprawling and scandent, to 1(–3) m high; young stems piloso-tomentose to hispidulous; leaves opposite, subsessile or petioles to ca. 5 mm long, blades ovate-deltate to lance-ovate or suborbicular, mostly 2–7 cm long, 1–5 cm wide, bases truncate to rounded or subcordate, margins subentire to coarsely serrate or dentate, apices obtuse to acute, abaxial faces dotted with resin globules and subglabrous or pilosulous to canescent with matted tomentum, adaxial faces glabrous or scabrellous; heads in terminal and axillary umbelliform clusters of (1)–3–8+ heads; peduncles 8–15(2–20) mm long; involucre cylindric-campanulate, mostly 6–8 mm high; phyllaries mostly 15–21, the outer 2–5 greenish, herbaceous, lance-linear to linear-oblong, shorter than to equal to the inner, indument as on leaves, the inner phyllaries golden-stramineous, often reddish distally or throughout, chartaceous to membranous or scarious, especially at margin, lance-linear to lanceolate or oblong, striate with orange to reddish pellucid nerves, glabrous but for ciliate margins; receptacles conic; paleae similar to inner phyllaries, stramineous, sometimes reddish distally, navicular to conduplicate, 6–7 mm long, the innermost trifid, the central lobe lance-subulate; ray florets none; disc florets 10–25(–40), corollas golden yellow, sometimes marked with red or orange, tubes 2–2.8 mm long, throats 1–1.8 mm long, abruptly dilated distally, lobes unequal, lance-linear, 1.1–2.8 mm long, glabrous throughout; style branches ca. 1.5 mm long, abruptly penicillate; cypselae blackish, obscurely pyramidal, somewhat flattened, 2–2.5 mm long, sparsely hairy, at least distally; pappi of 22–28, white to

stramineous, subequal, lance-subulate squamellae 4–5(–6) mm long; $2n = 38$; flowering Jun–Jan.

Openings or thickets in Lower Montane Rain, Montane Rain, Seasonal Evergreen, Tropical Deciduous, and Pine-Oak forests and in wet Savanna; common in Northern and Eastern highlands and on Central Plateau, less so on Gulf Coastal Plain and in Central Depression; 250–1700 m. Southern Mex. (Ver., Camp., Yuc., Q. Roo, Chis.), Guat., Bel., Hond., Nic., C.R.; Jamaica. CHIAPAS COLLECTIONS: *Br 114* (CAS); *Br 380* (CAS); *Br 381* (CAS); *Br 476* (CAS); *Chm 2* (UC); *Dr 1705* (UC); *RMK 3043* (TEX); *EM 3784* (LL, UC); *EM 5629* (CAS, LL); *EM 5669* (LL); *Rey 2021* (CAS); *Rey 2393* (CAS); *SC 717* (TEX); *SI 2951* (TEX); *We 17873* (UC); *We 17936* (CAS); *6397*; *11769*; *14479*; *25675*; *26117*; *26356*; *26660*; *39869*; *45971*; *46835*; *46952*; *46963*; *47188*; *48249*; *51593*; *52528*; *53115*; *57703*; *70667*.

3. *Calea longipedicellata* B. L. Rob. & Greenm., Proc. Amer. Acad. Arts 32:28. 1896.

— TYPE: Mexico, Oaxaca, near Choapam, 3800–4500 ft. [1157–1371 m], 28–29 Jul 1891, *E. W. Nelson 898* (GH). ILLUSTRATION: none found.

Shrubs, to 3+ m high; leaves opposite, sessile or subsessile, blades broadly lance-ovate to lanceolate, 3–6(–9) cm long, 2–3.5(–5) cm wide, somewhat coriaceous, bases cuneate, margins entire to remotely toothed, apices obtuse to acute, faces glabrous or minutely and sparsely pubescent; heads 1–4 in terminal “umbels”; peduncles 2–7 cm long; involucre hemispheric, 8–10 mm high; phyllaries 12–16+, subequal, the outer greenish, herbaceous, ovate to oblong, the inner stramineous or purplish, more membranous, distally scarious, all glabrous or nearly so; receptacles convex; paleae stramineous, scarious, oblong to lanceolate, navicular to conduplicate, 4–5.5 mm long, obscurely trifid, glabrous; ray florets none; disc florets 50–80+, corollas yellow to orange, glabrous, tubes 2.5–3 mm long, throats abruptly dilated at base, cylindric, ca. 2 mm long, lobes subequal, lance-deltate, ca. 1 mm long; style branches ca. 1.8 mm long, penicillate; cypselae blackish, nearly cylindric or obscurely angled, 2–2.5 mm long, glabrous, striate; pappi of 20–22, sordid to stramineous, subequal, subulate squamellae 5–6.5 mm long; $2n = 38$; flowering Sep.

Wet slopes in Montane Rain Forest; rare in Northern Highlands; 800 m. Southern Mex. (Ver., Oax., Chis.), Guat., Bel., Hond. CHIAPAS COLLECTION: 28126.

4. *Calea megacephala* B. L. Rob. & Greenm., Proc. Amer. Acad. Arts 32:21. 1896.

— LECTOTYPE (Wussow et al. 1985:247): Mexico, Chiapas, ridge back of Tonalá, 1200–2500 ft. [366–762 m], 10 Aug 1895, *E. W. Nelson 2884* (GH; isoelectotype: US).

Tonalanthus aurantiacus Brandegee, Univ. Calif. Publ. Bot. 6:75. 1914. — TYPE: Mexico, Chiapas, Sierra de Tonalá, Sep 1913, *C. A. Purpus 7002* (UC!; isotypes: GH, MO, NY).

ILLUSTRATION: none found.

Perennial herbs, to 6(–8) dm high; leaves often crowded at base, petioles 1–4(–8) cm long, cuneately winged, blades roughly deltate to lance-ovate, 5–15 cm long, 2–10 cm wide, bases broadly cuneate to truncate, margins coarsely dentate to subentire, apices acute, abaxial faces sparsely pilose to glabrate, adaxial faces weakly and sparsely scabrelous; heads borne singly; peduncles 20–50+ cm long; involucre broadly campanulate, 16–22 mm high; phyllaries 16–22, the outer greenish, herbaceous, ovate to oblong, 0.3–1 times as long as the inner, pilose to closely and minutely scabrelous, the inner stramineous to purplish, more membranous to scarious, oblong to lance-linear; receptacles narrowly conical, 6–11 mm high; paleae stramineous, oblong to lanceolate, navicular, 6–10 mm long, cupped at base of cypselas, distally acute to subulate; ray florets 12–25, corollas orange, often drying yellow, tubes very slender, 6–8 mm long, glabrous, laminae oblong to narrowly obovate, 8–15 mm long; disc florets 40–60+, corollas orange, often reddish distally, glabrous, tubes very slender, 3–4 mm long, throats narrowly funnelform, 5–6 mm long, lobes lance-linear, 2.5–3.5 mm long, attenuate; style branches 2.5 mm long, abruptly penicillate; cypselas blackish, somewhat flattened, linear-oblong in outline, 1–5 mm long, strigose-pilose or bulbous-papillate on faces; pappi of 13–25, stramineous, subequal, lanceolate to lance-subulate squamellae 4–6 mm long; $2n = 38$; flowering Aug–Nov.

Grassy openings in Evergreen Seasonal and Pine-Oak forests; common in interior Sierra Madre; 850–1100 m. Southern Mex. (Oax., Chis.). CHIAPAS COLLECTIONS: EWN 2884 (GH); P 7002 (UC); 20571; 37730; 38613; 46562; 46666; 52050; 52902; 54638.

5. *Calea ternifolia* Kunth, Nov. gen. sp., ed. fol. 4:231. 1820 [1818]; ed. qto. 4:294. 1820.

— TYPE: Locality not known, probably Mexico (see Wussow et al. 1985:253); *A. von Humboldt and A. J. A. Bonpland s.n.* [38070] (P).

Calea zacatechichi Schltdl., Linnaea 19:589. 1834. — TYPE: Mexico, Veracruz, near Jalapa, “Hacienda de la Laguna,” *C. J. W. Schiede s.n.* (HAL; isotype: P).

Calydermos rugosus DC., Prodr. 5:670. 1836. — *Calea rugosa* (DC.) Hemsl. in F. Godman and O. Salvin, Biol. cent.-amer., Bot. 2:206. 1881. — *Calea zacatechichi* Schltdl. var. *rugosa* (DC.) B. L. Rob. & Greenm., Proc. Amer. Acad. Arts 32:26. 1896. — LECTOTYPE (Wussow et al. 1985:255): Mexico, Cuernavaca, Oct 1827, *J. L. Berlandier 1061* (G-DC; isoelectotypes: GH, P).

Calydermos salmaefolius DC., Prodr. 5:670. 1836. — *Calea salmaefolia* (DC.) Hemsl. in F. Godman and O. Salvin, Biol. cent.-amer., Bot. 2:206. 1881. — LECTOTYPE (Wussow et al. 1985:257): Mexico, Tamaulipas, between Tula and Tampico, 1832, *J. L. Berlandier 2135* (G-DC; isoelectotypes: GH, K, MO, NY, P).

Aschenbornia heteropoda Schauer, Linnaea 19:716. 1847. — LECTOTYPE (Wussow et al. 1985, p. 255): Mexico, D. F., near Tacubaya, *A. Aschenborn 680* (US).

Calea albida A. Gray, Proc. Amer. Acad. Arts 15:38. 1880 [1879]. — TYPE: Mexico, San Luis Potosí, near San Luis Potosí, 1878, *C. C. Parry and E. Palmer s.n.* [448] (GH; isotypes: F, K, MO, NY).

Calea liebmanni Schultz-Bip. ex Klatt, Leopoldina 23:145. 1887. — *Alloispermum liebmanni* (Schultz-Bip. ex Klatt) H. Rob., Phytologia 38: 412. 1978. — TYPE: Mexico, Gualulu, *F. M. Liebmann s.n.* [411; 10953] (F; isotypes: C, GH).

Calea hypoleuca B. L. Rob. & Greenm., Proc. Amer. Acad. Arts 32:24. 1896. — LECTOTYPE (Wussow et al. 1985:257): Mexico, Oaxaca, Sierra de San Felipe, 6000 ft. [1829 m], 7 Sep 1894, *C. G. Pringle 5784* (GH; isoelectotype: K).

Calea nelsonii B. L. Rob. & Greenm., Proc. Amer. Acad. Arts 32:25. 1896. — TYPE: Mexico, Chiapas, ridge back of Tonalá, 1200–2500 ft. [366–762 m], 10 Aug 1895, *E. W. Nelson 2887* (GH; isotypes: K, UC).

Calea zacatechichi Schltdl. var. *macrophylla* B. L. Rob. & Greenm., Proc. Amer. Acad. Arts 32:26. 1896. — LECTOTYPE (Wussow et al. 1985:255): Guatemala, Alta Verapaz, near Cobán, 4300 ft. [1310 m], Feb 1888, *H. von Tuerckheim s.n.* [ed. J. Donnell Smith 1345] (GH; isoelectotypes: F, US).

Calea pringlei B. L. Rob., Proc. Amer. Acad. Arts 36:488. 1901. — TYPE: Mexico, Guerrero, above Iguala, 1230 m, 24 Oct 1900, *C. G. Pringle 8373* (GH; isotypes: F, K, MICH, MO, MSC, NY, UC, US).

Calea zacatechichi Schltdl. var. *calyculata* B. L. Rob., Proc. Amer. Acad. Arts 36:488. 1901. — *Calea ternifolia* Kunth var. *calyculata* (B. L. Rob.) Wussow, Urbatsch, & G. A. Sullivan, Syst. Bot. 10:256. 1985. — LECTOTYPE (Wussow et al. 1985:256): Mexico, Nuevo León, near Monterrey, 16 Jul 1888, *C. G. Pringle 2224* (GH).

Calea pringlei B. L. Rob. var. *rubida* Greenm., Publ. Field Columbian Mus., Bot. Ser. 2:272. 1907. — LECTOTYPE (Wussow et al. 1985:255): Mexico, Veracruz, near Chavarillo, 7 Sep 1906, *C. R. Barnes et al. 4* (F; isotype: CHI).

Calea leptoccephala S. F. Blake, Contr. U.S. Natl. Herb. 22:646. 1924. — TYPE: Mexico, Oaxaca, near Tonameca, 9 Nov 1917, *B. P. Reko 3544* (US).

Calea sororia S. F. Blake, Contr. U.S. Natl. Herb. 22:645. 1924. — TYPE: Guatemala, Huehuetenango, near Neuton, 915–1220 m, 13–15 Dec 1895, *E. W. Nelson 3544* (US; isotype: F).

Calea tejadae S. F. Blake, Contr. U.S. Natl. Herb. 22:646. 1924. — TYPE: Guatemala, near Agua Blanca, Nov 1913, *R. Tejada 80* (US).

Calea dichotoma Standl., Publ. Field Mus. Nat. Hist., Bot. Ser. 18:1438. 1938. — TYPE: Costa Rica, Maderal de San Mateo, Oct 1922, *A. M. Brenes 3665* (F; isotype: NY).

Calea acuminata Standl. & L. O. Williams, Ceiba 1:92. 1950. — TYPE: Honduras, Morazán, SE of El Zamorano, 850 m, 9 Oct 1948, *L. O. Williams and A. Molina 10546* (EAP; isotypes: F, LL, MICH, MO, UC!).

Calea acuminata Standl. & L. O. Williams var. *xanthactis* Standl. & L. O. Williams, Ceiba 1:93. 1950. — TYPE: Honduras, Morazán, valley of Río Yeguaré, between El Jicarito and Quebrada La Pita, 900 m, 13 Nov 1948, *A. Molina 1563* (EAP; isotype: F).

Calea zacatechichi Schltdl. var. *laevigata* Standl. & L. O. Williams, Ceiba 1:93. 1950. — TYPE: Honduras, Morazán, near Santa Clara, 850 m, 3 Sep 1949, *P. C. Standley 23410* (F).

Calea zacatechichi Schltdl. var. *xanthina* Standl. & L. O. Williams, Ceiba 1:93. 1950. — TYPE: Honduras, Morazán, between El Jicarito and El Pedregal, 800–950 m, 13 Nov 1948, P. C. Standley 14479 (F; isotype: EAP).
ILLUSTRATION: none found.

Shrubs, to 1(–3) m high; young stems piloso-tomentose to hispidulous or glabrate; leaves opposite, petioles 1–8(–12) mm long, blades broadly deltate-ovate to lanceolate, mostly 2–8(–12) cm long, 1.5–4(–6) cm wide, bases cuneate to truncate, margins subentire or remotely and finely serrate to coarsely dentate, apices obtuse to attenuate, abaxial faces villos or tomentose to pilose or glabrate or glabrous, usually dotted with resin globules as well, adaxial faces scabrellous to glabrate or glabrous; heads in terminal and axillary, simple or compound, umbelliform clusters of 5–8(3–15) heads; peduncles proper 2–5(–12) mm long, longer stalks of compound capitulescences up to 4 cm long; involucre narrowly to broadly cylindric-campanulate, mostly 5–8 mm high; phyllaries 11–24, the outer 0–5 greenish, herbaceous, ovate to lanceolate or oblong, 1.5–6 mm long, indument as on leaves, the rest more stramineous, sometimes marked with red or purple, chartaceous, strongly graduate, mostly ovate to oblong, mostly glabrous but for sometimes ciliolate, often scarious, margins; receptacles conic or merely convex; paleae stramineous, chartaceous to scarious, linear-oblong to oblanceolate, navicular to conduplicate, 5–7 mm long, striate-nerved, distally obtuse and erose to obscurely trifid or simply acuminate; ray florets none or 1–3(–5), corollas ochroleucous to pale yellow (rarely bright yellow), tubes 2–2.5 mm long, laminae narrowly oblong, 1–2(–3) mm long; disc florets mostly 8–15(–20), corollas ochroleucous to pale or bright yellow, variously dotted with resin globules, tubes 1.5–2.5 mm long, throats abruptly dilated, cylindric-funnelform to broadly campanulate, 0.5–1 mm long, lobes lance-linear, 1.5–2 mm long; style branches 1–1.5 mm long, abruptly penicillate; cypselae blackish or purplish, narrowly subterete, somewhat flattened or prismatic, 2–3+ mm long, including stramineous carpodium, sparsely hispidulous or glabrous; pappi of 8–12(–16), white to stramineous or purplish, lanceolate to spatulate, subequal squamellae 0.5–2 mm long; $2n = 38$; flowering mostly Aug–Nov.

Thickets and openings in Tropical Rain, Lower Montane Rain, Evergreen Seasonal, Tropical Deciduous, Pine-Oak-Liquidambar, and Pine-Oak forests and in grassy Savanna; common throughout much of the Central Plateau and Central Depression, less so on Gulf Coastal Plain, in Northern and Eastern highlands, in Sierra Madre, and on Pacific Coastal Plain; 700–1100(100–2300) m. Mex. (N.L., Tam., S.L.P., Jal., Qro., Hgo., Cma., Mich., Méx., Mlos., Pue., Ver., Gro., Oax., Yuc., Chis.), Guat., Bel., Salv., Hond., Nic., C.R. CHIAPAS COLLECTIONS: *Br* 648 (CAS); *C&L* 400 (CAS); *Crq* 9673 (TEX); *Crq* 10481 (DS); *Da* 9577 (LL); *GL* 220 (CAS); *RMK* 2982 (DS, TEX, UC); *EWL* 5114 (DS); *L* 1707 (DS); *L* 2096 (DS); *Lo* 131 (CAS); *M-I* 84 (CAS); *Mz* 10356 (CAS); *Mz* 14537 (TEX); *Mz* 16336 (LL); *Pa* 905 (CAS); *PM* 15 (CAS, TEX); *PM* 54 (CAS, TEX); *PM* 97 (CAS, TEX); *PM* 113 (CAS, TEX); *P* 9105 (DS, UC); *RM* 582 (CAS); *SI* 2401 (TEX); *RT* 41345 (DS); *T* 1474 (DS); *T* 1544 (DS); *T* 1803 (DS); *T* 2958 (DS, LL); *T* 9406 (TEX); *Ve* 2997 (TEX); *We* 17815 (DS); *We* 17995 (UC); *TW* 2354 (CAS, LL); 7580; 7592; 7941; 9124; 13069; 13167; 13312; 13326; 13542; 13648; 13907; 19791; 20348; 20428; 20569; 21177; 21781; 22187; 23424; 26870;

27331; 27396; 33328; 36865; 37243; 37397; 37461; 37863; 38547; 39812; 40033; 40825; 40852; 40931; 40958; 41137; 41175; 41196; 41237; 41512; 41812; 41888; 42156; 42226; 42312; 44374; 45985; 46046; 46074; 46369; 46672; 46826; 47007; 47044; 47150; 47830; 47883; 48063; 48108; 48203; 48610; 52459; 52704; 53074; 53678; 54698; 55631; 56351; 69980; 70339; 70592; 70923; 70962.

6. *Calea urticifolia* (Mill.) DC., Prodr. 5:674. 1836.

— *Solidago urticifolia* Mill., Gard. dict., ed. 8. no. 30. 1768. — *Caleacte urticifolia* (Mill.) R. Br., Trans. Linn. Soc. London 12:109. 1817. — *Calea axillaris* DC. var. *urticifolia* (Mill.) B. L. Rob. & Greenm., Proc. Amer. Acad. Arts 32:27. 1896 [illegit., oldest species epithet not used]. — TYPE: Mexico, Veracruz, 1731, *W. Houston s.n.* (BM).

Mocinna serrata Lag., Gen. sp. pl. 31. 1816. — *Galinsogea serrata* (Lag.) Spreng., Syst. veg. 3:579. 1826. — *Calea axillaris* DC., Prodr. 5: 673. 1836 [nom. nov. necessitated by *Calea serrata* Less., 1830]. — *Calea urticifolia* (Mill.) DC. var. *axillaris* (DC.) S. F. Blake, Contr. Gray Herb. 52:57. 1917. — TYPE: Mexico, Guanajuato, near Salamanca (“prope *Salmanticam urbem*”), *L. Neé s.n.* (MA).

Calea cacosmioides Less., Linnaea 5:157. 1830. — Mexico, Veracruz, near Jalapa, *C. J. W. Schiede* 351 (HAL).

Calea pellucidinerva Klatt, Bull. Soc. Roy. Bot. Belgique 31:207. 1892. — LECTOTYPE (Wussow et al. 1985:251): Costa Rica, “Bois a Terraba, 260 m,” Feb 1891, *A. Tonduz* 3726 (US).

Calea urticifolia (Mill.) DC. var. *yucatanensis* Wussow, Urbatsch, & G. A. Sullivan, Syst. Bot. 10:253. 1985. — TYPE: Mexico, Yucatán, Valladolid, 16 Jan 1938, *R. L. Crockett* 79 (MICH).

ILLUSTRATION: none found.

Shrubs, to 1(–3+) m high; young stems sparsely to densely villous to hispidulous; leaves opposite, petioles 3–10+ mm long, blades ovate-deltate to lance-ovate or lanceolate, mostly 3–11+ cm long, 1–4 cm wide, bases cuneate to subtruncate, margins sharply serrate to subentire, minutely revolute between the teeth, apices acute to acuminate, abaxial faces dotted with resin globules and pilosulous or glabrate, adaxial faces minutely hirtellous or scabrellous to sparsely pilose; heads in terminal and axillary umbelliform clusters of 3–8+ heads; peduncles slender, mostly 6–30 mm long; involucre narrowly to broadly campanulate or cylindric, 6–10 mm high; phyllaries 14–20, the outer 2(–4) greenish, herbaceous, ovate or lance-ovate to lance-linear, 2–3(–8) mm long, indument as leaves, the inner greenish to golden-stramineous, often marked with red or purple, more chartaceous, marginally and distally scarious, ovate to oblong or oblanceolate, usually strongly graduated, the innermost longest, sparsely pubescent to glabrate, sometimes dotted with resin globules; receptacles conic; paleae stramineous, scarious, navicular to conduplicate, lance-acuminate or obscurely trifid with subulate middle lobes, 6–7 mm long overall; ray florets 3–8, corollas very pale to bright yellow, tubes 2–3 mm long, glabrous, laminae oblong to flabellate, often deeply 3(2–4)-lobed, 3–5(–10) mm long; disc florets 15–25(–40+), corollas yellow, often with orange or reddish nerves, glabrous, tubes 1.7–2.2 mm long, throats funnelform to campanulate, 0.8–1.7

mm long, lobes lance-linear, subequal, (1-)1.8-2.4 mm long; style branches 1-1.5 mm long, abruptly penicillate; cypselae black, somewhat flattened or obscurely prismatic, 2-3 mm long including stramineous carpodium, shortly pilosulous; pappi of 12-18(-22), stramineous to whitish, subequal, lanceolate to lance-subulate squamellae 2.5-4.5 mm long; $2n = 38$; flowering mostly Nov-Feb.

In thickets in Evergreen Seasonal, Tropical Deciduous, Pine-Oak-*Liquidambar*, and Pine-Oak forests; uncommon in SW Northern Highlands, in NW Sierra Madre, and on Central Plateau, rare in Central Depression and Eastern Highlands;

500-1600 m. Mex. (Tam., Sin., Dgo., Zac., S.L.P., Nay., Jal., Hgo., Cma., Mich., Pue., Ver., Gro., Oax., Yuc., Q. Roo, Chis.), Guat. to Pan.; adventive in Africa. CHIAPAS COLLECTIONS: *Br 804* (CAS); *Co 5032* (CAS, TEX); *Funk 2572* (TEX); *Glie CH-39* (DS); *GG 223* (TEX); *L 720* (DS, LL); *Neff 93-4-11-7* (TEX); *Pa 1133* (CAS); *Prat 1098a* (CAS, TEX); *Prat 1148* (CAS); *SL 1252* (CAS); *SC 524* (CAS, TEX); *Sund 2468* (CAS, TEX); *T 3372* (DS, LL); *T 3461* (DS); *T 3629* (DS); *7735*; *8809*; *23577*; *32291*; *33487*; *48087*; *48556*; *49008*; *56271*; *71074*.

10. CALYPTOCARPUS

Calyptocarpus Less., Synop. gen. Compos. 221. 1832. — TYPE: *Calyptocarpus vialis* Less.

Prostrate to sprawling, perennial herbs, stems to 3+ dm long; leaves opposite, petiolate, blades deltate-ovate to lanceolate, 3-veined from near their bases, margins remotely toothed, faces strigose to subscabrous; heads terminal and axillary, borne singly or 2-3 together, sessile or pedunculate; involucre obconic to campanulate, mostly 7-12 mm high; phyllaries mostly 5, thin, herbaceous, broadly oblanceolate to lance-linear, strigose; receptacles convex; paleae persistent, scarious throughout, very slender; ray florets 3-8, pistillate, fertile, corollas yellow; disc florets ca. 10-20, bisexual, fertile, corollas yellow, very slender, glabrous but for the 4-5 minutely papillate lobes, tubes shorter than narrowly funnelform throats; style branches distally attenuate and hispidulous; cypselae of ray and disc similar, dark, radially flattened, narrowly cuneate, often tuberculate; pappi of 2(-5), stout, erect to reflexed awns; $x = 12$.

Two species: one in southern United States, eastern Mexico (to Oax. and Yuc.), and Cuba; the other in southern Mexico and Central America.

REFERENCE: McVAUGH, R. and N. SMITH. 1967. *Calyptocarpus vialis* and *C. wendlandii* (Compositae). Brittonia 19:268-272.

1. *Calyptocarpus wendlandii* Schultz-Bip., Bot. Zeitung (Berlin) 24:165. 1866.

— LECTOTYPE (McVaugh and Smith 1967:272): Costa Rica, San José, 17 Jul 1857, *H. Wendland 1078* (Berlin?, destroyed?; fragment: US, fide McVaugh and Smith).

ILLUSTRATION: Brittonia 19:269. 1967. (Fruit.)

Sprawling, perennial herbs, stems mostly 1-3 dm long, often rooting at proximal nodes; petioles mostly 5-15 mm long, leaf blades broadly lanceolate to ovate, 25-65 mm long, 16-38 mm wide, faces sparsely strigose to subscabrous; heads terminal and axillary, borne singly or 2-3 together, sessile or on slender peduncles to 4 cm long; involucre narrowly campanulate to obconic, 7-12 mm high; phyllaries mostly 5, green, thin, herbaceous, narrowly to broadly oblanceolate, mostly strigose; paleae scarious, lance-linear, green-tipped, ca. 7 mm long; ray florets 3-8, corollas yellow, often fading, tubes ca. 2 mm long, laminae narrowly to broadly ovate, 4-6 mm long; disc florets 12-20(?+), corollas yellow, at least distally, 4-5 mm long, tubes

ca. 1.5 mm long, throats very narrowly funnelform, ca. 2.5 mm long, lobes 4(-5), broadly deltate, minutely papillate; style branches ca. 1 mm long; cypselae blackish to greenish brown, narrowly cuneate, 5-7 mm long, tuberculate and strigose; pappi of 2(-3), stout, tawny to greenish, reflexed or horizontally spreading awns 2-5 mm long; $2n = 72$; flowering Jul-Nov.

Moist slopes and along streams and trails in Evergreen Seasonal, Tropical Deciduous, Pine-Oak-*Liquidambar*, and Pine-Oak forests; common on Central Plateau and in Central Depression, less so in Northern and Eastern highlands and in Sierra Madre; 500-1800 m. Southern Mex. (Méx., Chis.), Guat., Hond., Salv., Nic., C.R. CHIAPAS COLLECTIONS: *C 246* (DS); *HTG 42* (DS); *L 892* (DS); *L 1616* (DS); *L 2609* (DS); *Mz 8683* (TEX); *EM 738* (MICH); *Pa 1368* (CAS); *SR 267* (CAS); *T 329* (DS); *T 2715* (DS, LL); *Vi 884* (TEX); *6162*; *7373*; *12764*; *13474*; *19916*; *20200*; *21131*; *38427*; *39020*; *46082*; *46446*.

11. CHRYSANTHELLUM

Chrysanthellum Rich. ex Pers., Syn. pl. 2:471. 1807. — TYPE: *Chrysanthellum procumbens* Rich. ex Pers., 1807 [nom. superfl., based on *Verbesina mutica* L. 1763, nom. superfl., based on *Anthemis americana* L., 1753.]. = *Chrysanthellum americanum* (L.) Vatke.

Annual (perennial) herbs, stems often prostrate-ascending, mostly less than 3 dm long; leaves basal and/or cauline, the latter opposite or alternate, simple to 1-2(-3)-pinnatifid, faces glabrous or, exceptionally, hairy; heads borne singly or loosely associated

on terminal or axillary peduncles; involucre mostly turbinate, 2–6 mm high, usually subtended by calyculi of 2–5 bractlets; phyllaries mostly 8–15, biseriate, broadly lanceolate to lance-linear, striate, scarious-margined; receptacles flat to convex; paleae mostly linear to filiform, membranous to scarious; ray florets 5–50+, pistillate, fertile, corollas golden to pale yellow or whitish, inconspicuous to showy; disc florets bisexual and fertile or functionally staminate, corollas yellow to reddish orange, tubes much shorter than the campanulate to urceolate throats, lobes (4–)5, deltate, erect; style branches papillose-hispidulous beyond the stigmatic lines or throughout, when astigmatic; cypselae often dimorphic, those of ray florets circinately coiled or straight and columnar to slightly clavate, those of disc florets commonly ob-compressed or -flattened, with corky, ciliolate and/or tuberculate, margins; pappi none; $x = ?4, ?8$.

Ten species, mostly restricted to Mexico and Central America, others extending to Antilles, South America, Galapagos Islands, Himalyan India, Africa, and Madagascar.

REFERENCE: ALEXANDER, E. J. 1955. *Chrysanthellum*. In N. L. Britton et al., N. Amer. fl., ser. ii. 2:147–149; TURNER, B. L. 1982. New species and combinations in *Chrysanthellum* (Asteraceae-Coreopsidae [sic]). Phytologia 51:291–293.

- a. Ray corollas inconspicuous, mostly pale yellow to whitish, 1–4(–6) mm long; disc florets mostly bisexual, fertile, some or all producing cypselae.
 - b. Leaves undivided, pinnate, or pinnatifid, blades or lobes oblanceolate to cuneate or linear, 3–8+ mm wide; phyllaries mostly 4–5 mm long; ray corolla laminae 2–4+ mm long 1. *C. americanum*
 - bb. Leaves 2(–3)-pinnatifid, lobes lance-linear to filiform, mostly 1–2 mm wide; phyllaries 2–3+ mm long; ray corolla laminae mostly less than 2 mm long 2. *C. indicum*
- aa. Ray corollas fairly conspicuous, bright orange-yellow, 5–8 mm long; disc florets functionally staminate, none producing cypselae.
 - c. Leaves not divided, mostly 12–25 mm wide; cypselae columnar-clavate, 8-ribbed or -grooved 3. *C. integrifolium*
 - cc. Leaves pinnatifid, at least in part, blades or lobes 1–7 mm wide; cypselae circinate, echinate.
 - d. Perennials; leaves or lobes linear, 1.5–3 mm wide 4. *C. perennans*
 - [dd. Annuals; leaves or lobes cuneate to lance-linear, 3–7 mm wide *C. pilzi*]

1. *Chrysanthellum americanum* (L.) Vatke, Abh. Naturwiss. Vereine Bremen 9:122. 1885.

- *Anthemis americana* L., Sp. pl. 895. 1753. — TYPE: Jamaica, *H. Sloane s.n.* (BM).
 - *Verbesina mutica* L., Sp. pl., ed. 2. 1273. 1763 [nom. superfl., based on *Anthemis americana* L.].
 - *Chrysanthellum procumbens* Rich. ex Pers., Syn. pl. 2:471. 1807 [nom. superfl., based on *Verbesina mutica* L., q.v.].
- ILLUSTRATION: Fig. 7.

Annuals (short-lived perennials?), prostrate to ascending, stems mostly 8–15 cm long; leaves undivided or pinnatifid, mostly 3–5 cm long, blades or lobes oblanceolate to cuneate or linear, 2–8+ mm wide, often coarsely toothed; heads borne singly (or paired) on terminal peduncles mostly 3–4(–7) cm long; involucre turbinate to hemispheric; calyculi of 2–4 subulate bractlets 1–2 mm long; phyllaries ca. 12, broadly lanceolate to ovate, mostly 4–5 mm long; paleae linear, membranous to scarious, ca. 4 mm long; ray florets 13–34, corollas yellow fading to whitish with 2–4 darker nerves, laminae linear, 2–4+ mm long; disc florets 20–30, usually some bisexual, fertile, corollas yellow-orange to whitish, tubes 0.4–0.6 mm long, throats dilated, campanulate to funnellform or urceolate, 0.9–1.9 mm long, lobes 5, narrowly deltate, 0.2–0.5 mm long; style branches with shaggy, papilloso-hispidulous appendages 0.5–0.8 mm long; cypselae (ray) pale, columnar to weakly flattened, striate-grooved on abaxial and adaxial faces, 2–4 mm long and (disc) pale to blackish, flattened, narrowly oval to

subrectangular in outline, 2.2–3.5 mm long, ciliolate on the somewhat corky margins; $2n = 16$; flowering Aug–Oct.

Ruderal, along paths and in other disturbed places, probably more common than collections suggest; edge of Northern Highlands and in Central Depression; 530–1200 m. Southern Mex. (Chis.), Guat., Hond., C.R.; Antill. CHIAPAS COLLECTIONS: 20071; 38273; 45982; 52145.

2. *Chrysanthellum indicum* DC., Prodr. 5:631. 1836.

- TYPE: India, “ad Gojpur ad Sukanaghur,” Wallich s.n. [cat. no. 3291/401] (not seen).

All Chiapas collections of this species are referable to:

2a. *Chrysanthellum indicum* DC. var. *mexicanum* (Greenm.) B. L. Turner, Phytologia 51:291. 1982.

- *Chrysanthellum mexicanum* Greenm., Proc. Amer. Acad. Arts 39:114. 1903. — LECTOTYPE (Alexander 1955:149): Mexico, Jalisco, near Guadalajara, 10 Sep 1890, C. G. Pringle 3259 (GH; islectotypes: F, GH, ENCB, K, MICH, NY, S, UC!).
- Coreopsis diffusa* M. E. Jones, Contr. W. Bot. 18:73. 1933. — TYPE: Mexico, Jalisco, “La Barranca” at Guadalajara, 17 Nov 1930, M. E. Jones 27720 (POM).

ILLUSTRATION: none found.

Prostrate to erect annuals, stems to 25+ cm long; leaves basal and cauline, the latter subopposite or alternate, all 2(–3)-pinnatifid, 1–3(–9) cm long including petioles, ultimate divisions lance-linear to filiform, mostly 1–2 mm wide; heads loosely associated on terminal and axillary peduncles mostly 1–3+ cm long; involucre narrowly turbinate; calyculi of 1–3 bractlets; phyllaries ca. 8–13, mostly ovate, 2–3+ mm long; paleae linear, ca. 2.5 mm long; ray florets mostly 5–13, corollas inconspicuous, mostly less than 1(–2) mm long (yellow?, fading to white?); disc florets 8–15, bisexual, fertile, corollas yellow, minute, scarcely 1 mm long, tubes ca. 0.3 mm long, throats campanulate-dilated, ca. 0.6 mm long, lobes (4–)5, deltate, ca. 0.2 mm long; style branches ca. 0.4 mm long, minutely papillose-hispidulous distally; cypselae (ray) pale, weakly flattened and somewhat clavate, corky, smooth or slightly grooved near base, ca. 2.8 mm long and (disc) dark, definitely flattened, corky and ciliolate-margined, ca. 2 mm long; $2n = 16$; flowering Jul–Sep.

Open, especially wet, often disturbed, places in Evergreen Seasonal and Pine-Oak forests; uncommon in Northern Highlands and Sierra Madre; 900–1100 m. Mex. (S.L.P., Nay., Jal., Mich., Méx., Oax., Chis.), Guat. CHIAPAS COLLECTIONS: P 9116 (UC); 27319; 51670; 52168; 52629; 70054.

3. *Chrysanthellum integrifolium* Steetz in B. C. Seemann, Bot. voy. *Herald* 160. 1854 [1853].

— *Chrysanthellum americanum* (L.) Vatke var. *integrifolium* (Steetz) Alexander in N. L. Britton et al., N. Amer. fl., ser. 2. 2:148. 1955. — TYPE: Panama, in savannas, *J. Steetz s.n.* [601] (BM).

ILLUSTRATION: none found.

Annuals, often rosulate, stems spreading and prostrate to ascending, mostly 1–3 dm long; leaves not divided, narrowly spatulate to oblanceolate, mostly 2–6(–8) cm long including petioles, distally serrate; heads borne singly on terminal peduncles (2–)5–15 cm long; involucre broadly turbinate to hemispheric; calyculi of 3–5 subulate bractlets 2–4 mm long; phyllaries ca. 13, broadly lanceolate to ovate, mostly 5–6 mm long; paleae linear to filiform, ca. 3.5 mm long; ray florets 20–35(–55), corollas yellow with 2 darker nerves, laminae linear, 5–8 mm long; disc florets 25–40, functionally staminate,

corollas yellow, tubes 0.6–0.8+ mm long, throats ampliate, cylindric to urceolate, 1.3–1.7+ mm long, lobes (4–)5, deltate, ca. 0.3+ mm high; style branches papillate-hispidulous throughout, non-stigmatic, 1.4–1.9 mm long; cypselae reddish brown, columnar-clavate, 3–4 mm long, longitudinally 8-ribbed or -grooved.

Ruderal in wet clearings on "brushy slopes" on Pacific Coastal Plain; 61 m. Mex. (Ver., Oax., Chis.), Hond., Salv., Pan. CHIAPAS COLLECTION: C 470 (DS).

4. *Chrysanthellum perennans* B. L. Turner, *Phytologia* 51:293. 1982.

— TYPE: Mexico, Oaxaca, 22 km NW of Zanatepec on route 190, ca. 100 m, 10 Jul 1958, *R. M. King* 463 (LL; isotype: MICH).

ILLUSTRATION: none found.

Decumbent perennials, stems to ca. 15 cm long; proximal leaves crowded, 6–8 cm long, 1–2-pinnatifid or pedate, the cauline opposite, trifid or undivided, blades or lobes linear, 1–6 cm long, 1.5–3 mm wide; heads borne singly on peduncles 7–12(–20) cm long; involucre narrowly turbinate; calyculi of 2–5 short, subulate bractlets; phyllaries ca. 8, lance-ovate to lance-linear, 3–5 mm long; paleae linear, ca. 2.5 mm long; ray florets 6–13, corollas golden yellow-orange with 6–9 darker nerves, laminae cuneate-linear, 6–8 mm long, 2 mm wide, deeply bifid; disc florets ca. 12, functionally staminate, corollas deep yellow to orange, 3–3.5 mm long, tubes slender, ca. 0.8 mm long, throats campanulate, ca. 2 mm long, lobes deltate, ca. 0.5 mm long; style branches papillate-hirtellous, astigmatic, ca. 2.5 mm long; cypselae (ray) stramineous to puce, circinate, 1–5 mm high, adaxial surface convex, echinate.

Known only from the type and *D. E. Breedlove* 52903 (Municipio Cintalapa, ca. 23 km W of Las Cruces, ridge with Pine-Oak Forest and streams with Evergreen Seasonal Forest, 870 m, 19 Sep 1981).

Taxon to be looked for in Chiapas:

Chrysanthellum pilzii Strother — Oax., beaches near Salina Cruz. See couplet d/dd in key.

12. CLIBADIUM

Clibadium L., Mant. pl. 161, 294. 1771. — TYPE: *Clibadium surinamense* L. *Baillieria* Aubl., Hist. pl. Guiane 2:804. 1775. — LECTOTYPE (not designated).

Trixis Sw., Prodr. 7, 115. 1788, non P. Browne 1756, = *Baillieria* Aubl.

Oswalda Cass. in F. Cuvier, Dict. sci. nat., ed. 2. 59:319, 322. 1829. — *Oswaldia* Less. 1832, [orthogr. var.]. — TYPE: *Oswalda baillierioides* Cass.

Orsinia Bertol. ex DC., Prodr. 5:104. 1836, non *Orsina* Bertol. 1830. — TYPE: *Orsinia eupatoria* DC. [nom. illegit., cited *Eupatorium armanii* Balbis in synonymy].

Shrubs or trees, to 3(–6) m high, exceptionally scandent or herbaceous; leaves opposite, usually petiolate, sometimes subsessile, blades usually lanceolate to ovate, often 3(–5)-nerved near or at base, margins subentire to serrate, faces scabrellous to strigose, piloso-hispidulous, subtomentose, or glabrescent; heads usually 50–300+ in open or congested, corymbiform or paniculiform aggregations (the primary units often bracteolate and scorpioid or capitate); peduncles very short or wanting; involucre cylindro-campanulate to hemispheric, 2–4(–6) mm high; phyllaries 6–15+ in 2–3 series, graduate or subequal, often very pale green or purplish, membranous, striate-nerved, ciliolate, often drying purplish or blackish (reported to be somewhat

fleshy in fruit); receptacles flat or nearly so; paleae variously none or only peripheral or subtending most or all inner florets, stramineous or whitish, scarious, distally strigoso-hispidulous; pistillate florets 3–8(–30+) in 1–2+ series, corollas usually inconspicuous, ochroleucous (pinkish or purplish), mostly cylindric, 2–5-lobed, actinomorphic or weakly zygomorphic; functionally staminate florets 3–12+, corollas ochroleucous to pinkish or purplish, tubes stout, fleshy, much shorter than the gradually to abruptly dilated, funnellform to campanulate throats, lobes 5, deltate, abaxially papillate to piloso-villous, ovaries often densely villous, anthers black-purple; styles distally hirsutulous, minutely bifid; cypselae reported to be somewhat fleshy when fresh, in dry state: blackish purple or puce, obcompressed and lenticular to obovoid or obpyriform, variously hairy, papillate, or glabrous; pappi none (or 2 inconspicuous awns?); $x = 8$ ($2n = 32, ?34, 48, 64$).

Twenty or so species, all Neotropical; one or two adventive in Old World.

1. *Clibadium surinamense* L., Mant. pl. 294. 1771.

— TYPE: Surinam, *Alemand s.n.* (?BM, ?LINN). — NEO-TYPE (Hind 1993, Reg. Veg. 127:35): Suriname, 1843, *W. R. Hostmann* 647 (K; isoneotype: NY).

Baillieria aspera Aubl., Hist. pl. Guiane 2:804, tab. 317. 1775.

— *Clibadium asperum* (Aubl.) DC., Prodr. 5:506. 1836.

— *Clibadium surinamense* L. var. *asperum* (Aubl.) Baker in C. F. P. von Martius, Fl. Brasil. 6(3):152. 1884. — TYPE: French Guiana, “Caïennae & Guianae,” *J. B. C. F. Aublet s.n.* (BM; isotype: G-DC).

Clibadium villosum Benth., Pl. Hartweg. 205. 1845. — TYPE: Colombia, Bogota, near Tena, Feb–Apr 1813, *C. T. Hartweg* 1139 (K).

Clibadium leiocarpum Steetz in B. C. Seemann, Bot. voy. Herald 152. 1852 [1853]. — TYPE: Panama, Veraguas, volcano Chiriquí, 7000 ft. [2134 m], Feb 1849, *B. C. Seemann* 1592 (K).

Clibadium arboreum Donn.Sm., Bot. Gaz. 14:26. 1889. — TYPE: Guatemala, Alta Verapaz, Pansamalá, 3800 ft. [1160 m], Jun 1886, *H. von Tuerckheim s.n.* [ed. J. Donnell Smith 929] (not seen).

Clibadium donnell-smithii J. M. Coul., Bot. Gaz. 16:98. 1891. — TYPE: Guatemala, Guatemala, 5000 ft. [1524 m], Feb 1890, *J. Donnell Smith* 2347 (US; isotype: K).

Clibadium lanceolatum Rusby, Descr. S. Amer. pl. 150. 1920. — TYPE: Colombia, Magdalena, Santa Marta Mts., 1898–1899, *H. H. Smith s.n.* (NY).

Clibadium latifolium Rusby, Descr. S. Amer. pl. 150. 1920. — TYPE: Colombia, Magdalena, 2 miles [3 km] up the river Buritaca, 28 Sep 1898, *H. H. Smith* 2014 (NY).

Clibadium appressipilum S. F. Blake, Contr. U.S. Natl. Herb. 22:600. 1924. — TYPE: Panama, Darién, Boca de Cupe, 13 Apr 1908; *R. S. Williams* 698 (US; isotypes: NY).

Clibadium pueblanum S. F. Blake, Contr. U.S. Natl. Herb. 22:601. 1924. — TYPE: Mexico, Puebla, Huauchinango, Pahuatlán, 4 Oct 1914, *F. Salazar s.n.* (US; isotype: GH).

Clibadium schultzei S. F. Blake, Contr. U.S. Natl. Herb. 22:602. 1924. — TYPE: Costa Rica, Copey, 1800 m, Mar 1898, *A. Tonduz* 11915 (US; isotype: US).

Clibadium oligandrum S. F. Blake, Brittonia 2:342. 1937. — TYPE: Guatemala, Quezaltenango, volcano Zunil, 1675 m, 3 Aug 1934, *A. F. Skutch* 927 (A; isotype: BM).

Clibadium leiocarpum Steetz var. *strigosum* S. F. Blake, J. Wash. Acad. Sci. 27:382. 1937. — TYPE: Costa Rica, San José, Cerro de Piedra Blanca, above Escasu, 31 Jan 1924, *P. C. Standley* 32593 (US).

Clibadium surinamense L. var. *macrophyllum* Steyer., Fieldiana, Bot. 28:629. 1953. — TYPE: Venezuela, Sucre, Cerro Turumiquire, SW of Cocollar, between La Trinidad

and Quebrada El Boquerón, 1700–1840 m, 3 May 1945, *J. A. Steyermark* 62437 (F).

ILLUSTRATIONS: **Fig. 8**; Fl. Novo-Galiciana 12:211. 1984; both as *C. arboreum*.

Shrubs, 2–3(–6) m high, sometimes treelike; stems often densely villous or sublanate; petioles 3–6(1–13) cm long, leaf blades lanceolate to deltate-ovate, 10–16(5–30) cm long, 5–9(2–20) cm wide, 3–5-nerved from near base, bases subtruncate to narrowly cuneate, often somewhat decurrent onto petiole, margins coarsely to finely serrate or dentate, apices acute to attenuate, abaxial faces piloso-villous to piloso-hispidulous, more densely so on nerves, adaxial faces sparsely strigose and minutely asperous to nearly glabrous; heads 50–150(–200+) in somewhat open to densely congested, corymbiform or paniculiform clusters 4–15+ cm across, individual axes often scorpioid; peduncles 0–1(–3) mm long; involucre cylindro-campanulate to hemispheric, 3–6 mm high; phyllaries 8–14 in 3+ series, slate green to ochroleucous (often drying black or purplish), thinly herbaceous to membranous, ovate-orbicular to oblong or lanceolate, subequal or the outer 1–3 shorter, all striate-nerved, abaxially strigillose to subglabrous, ciliate, apically obtuse to acute; receptacles flat; paleae wanting; pistillate florets 3–6(–9), corollas ochroleucous, narrowly to stoutly cylindric, 2–3.5 mm long, the 3–4 lobes lance-deltate to deltate, ca. 0.5 mm long; functionally staminate florets mostly 4–14+, corollas ochroleucous, tubes 0.5–0.8 mm long, glabrous, somewhat fleshy, throats gradually or abruptly dilated, funnellform to campanulate, 2.5–3 mm long, glabrous, lobes deltate, ca. 0.8 mm long, abaxially pilose to strigillose, anthers black or purplish, ovaries linear, distally pilose or villous; styles minutely bifid; cypselae in dry state: reddish brown to blackish or purplish, somewhat lenticular, obpyriform, or obovoid, weakly stipitate, often obscurely beaked, 1.8–3 mm long, distally villous, otherwise glabrous; pappi none.

Wet places in Tropical Rain, Lower Montane Rain, Montane Rain, Evergreen Cloud, Evergreen Seasonal, and Pine-Oak-*Liquidambar* forests; locally common in Northern Highlands, less so in Eastern Highlands, on Central Plateau, and in Sierra Madre; 300–2000(–2600) m. Southern Mex. (Jal., Ver., Gro., Tab., Chis.), Guat., Hond., Nic., C.R., Pan.; into S.A. (to Peru and Bol.). CHIAPAS COLLECTIONS: *Calz* 3708 (TEX); *Cast* 2783 (TEX); *C* 172 (DS); *Cro* 40141 (UC); *GS* 204 (CAS); *GE* 1994 (CAS); *GG* 187 (TEX); *EL* 6740 (DS); *LG* 10 (CAS); *EM* 2422 (UC); *Och* 4311 (CAS); *R&B* 19974 (DS); *SI* 2374 (TEX); *SI* 2390 (TEX); *RT* 40414 (DS); *RT* 41690 (DS); *Ti* 636–64 (DS); *T* 2496 (DS); *T* 2829 (DS); *T* 3311 (DS); *T* 6770 (TEX); *We* 17708 (DS); 8973; 8997; 10145; 15423; 20746; 26410; 26504; 31663; 35140; 35366; 42714; 46803; 46934; 47704; 48264; 56150.

13. COMACLINIUM

Comacelinium Scheidw. & Planch., Fl. Ser. Jard. l'Europe 8:19, t. 756. 1852. — TYPE: *Comacelinium aurantiacum* Scheidw. & Planch. = *Comacelinium montanum* (Benth.) Strother.

Perennial herbs, to 10 dm high; leaves mostly opposite, the distal sometimes alternate, blades simple (rarely trifoliate), lanceolate, usually with 1–3 pairs of subulate-setose lobules at base, bearing pellucid glands in lines between the nerves; heads borne singly on weakly fistulose peduncles; involucre campanulate, 12–15 mm high; calyculi of 3–12 bractlets; phyllaries 10–16 in 2 series, free or nearly so, streaked with linear or elliptic pellucid glands; receptacles roughened with minute enations; paleae none; ray florets 10–15, pistillate, fertile, corollas orange; disc florets ca. 50+, bisexual, fertile, corollas yellow to orange, tubes and throats about equal, lobes 5, lance-linear, unequal; style-branch appendages conic, papillate; cypselae stoutly obpyramidal, pubescent; pappi of ca. 20 squamellae, the outer shorter, each squamella comprising 5–10, basally connate bristles; $x = 13$.

Monotypic; related to *Adenophyllum*.

REFERENCÉS: STROTHER, J. L. 1969. Systematics of *Dyssodia* Cavanilles (Compositae: Tageteae). Univ. Calif. Publ. Bot. 48:1–88.; ———. 1986. Renovation of *Dyssodia* (Compositae: Tageteae). Sida 11:371–378.

1. *Comacelinium montanum* (Benth.) Strother, Sida 11:377. 1986.

— *Clomenocoma montana* Benth., Pl. hartw. 86. 1841. — *Dyssodia montana* (Benth.) A. Gray, Proc. Amer. Acad. Arts 19:38. 1883. — TYPE: Guatemala, "In montibus Aceytuno [Aceituno], prope Guatemala," C. T. Hartweg s.n. [592] (K; isotypes: LE!, NY!, P!).

Comacelinium aurantiacum Scheidw. & Planch., Fl. Ser. Jard. l'Europe 8:19, t. 756. 1852. — TYPE: no specimen seen; use of this name here is based on the illustration.

Dyssodia integrifolia A. Gray, Proc. Amer. Acad. Arts 19:37. 1883. — *Gymnolaena integrifolia* (A. Gray) Rydb. in N. L. Britton et al., N. Amer. fl. 34:161. 1915. — TYPE: Mexico, Chiapas, "along streams in the mountains," 1864–1870, A. B. Ghiesbreght s.n. [784] (GH!).

ILLUSTRATIONS: Fig. 9; Ann. Missouri Bot. Gard. 62:1224. 1975; Univ. Calif. Publ. Bot. 48:52. 1969; all as *Dyssodia montana*.

Perennial herbs, mostly 3–10 dm high; leaves opposite, sometimes the distal alternate, blades usually simple (rarely trifoliate *fide* Keil), narrowly to broadly lanceolate to ovate, sometimes attenuate, mostly 4–10 cm long, margins serrate,

ciliolate, often bearing 2–6 setaceous lobules at base, faces glabrous or sparsely hirtellous, dotted with pellucid glands; heads borne singly, erect, on bracteate peduncles 10–25 cm long; involucre broadly campanulate, 12–15 mm high; phyllaries 10–16 in 2 series, free to base, oblong to elliptic, each streaked with linear to elliptic, pellucid glands; ray florets 10–15, corollas yellow to orange with darker veins, laminae oblong, 10–15 mm long; disc florets ca. 50+, corollas yellow-orange with darker nerves, 9–12 mm long, tubes about equaling throats, puberulent, lobes lance-linear, 2–3 mm long, unequal; cypselae weakly angled, ca. 3 mm long, hirtellous to subsericeous; pappi of ca. 20 squamellae in 2 series, the inner to 10 mm long, the outer shorter, each squamella comprised of 5–10, basally connate bristles; $2n = 26$; flowering mostly Nov–Jan.

Wet to dry, brushy to open slopes and banks in Tropical Rain, Evergreen Seasonal, Tropical Deciduous, and Pine-Oak-*Liquidambar* forests; uncommon in Eastern Highlands, on S Central Plateau, and in Sierra Madre; 100–1500 m. Southern Mex. (Chis.), Guat., Salv., C.R., Pan. CHIAPAS COLLECTIONS: Calz 3954 (TEX); G 784 (GH); PM 168 (CAS, TEX); SC 719 (TEX); T 5451 (TEX); 6402; 7743; 30949; 42463; 47674; 49572.

14. COREOPSIS

Coreopsis L., Sp. pl. 907. 1753. — LECTOTYPE (N. L. Britton and A. Brown, Ill. fl. n. U.S., ed. 2. 3:489. 1913): *Coreopsis lanceolata* L.

For fuller synonymy, see Sherff (1936, 1955).

Annuals, perennial herbs, or shrubs, mostly less than 1 m, sometimes to 3 m, high, glabrous or variously hairy; leaves mostly opposite, sometimes alternate distally, blades simple and entire to serrate or 1–3 pinnately or palmately parted; heads borne singly (sometimes on scapiform peduncles) or 3–20+ in corymbiform to paniculiform clusters; involucre mostly campanulate to cylindric, 4–12+ mm high; phyllaries usually biseriate and heteromorphic, the outer mostly 5 or 8, often herbaceous to fleshy and spreading to reflexed, the inner mostly more membranous to scarious and erect; receptacles flat to convex; paleae resembling the inner phyllaries but narrower; ray florets typically 5, 8, 13, etc., sometimes none, usually neuter or styliferous and sterile, rarely fertile, corollas yellow to orange, often bicolored with darker (brown to purple) bases, rarely rosaceous or white; disc florets mostly 10–30 (–50+), usually bisexual and fertile (sometimes innermost functionally staminate), corollas yellow to purplish brown, rarely rosaceous, tubes glabrous or pubescent, about equalling the glabrous throats, narrower, lobes 4 (–5), equal, stoutly to narrowly deltate; filaments glabrous; style branches usually hispidulous-dilated and penicillate-appendaged; cypselae typically ob-flattened, oblong-elliptic to orbicular in outline, often with scarious to corky, entire to pectinate, margins or wings, sometimes

also corky papillate on one or both faces, sometimes villous; pappi none or of 2 awns, sometimes with an additional short crown of erose scales, awns *not* retrorsely barbed; $x = 13, 14?$ (6, 7?).

Perhaps 100 or more species, pantropical, mostly New World, extending into temperate regions in North America.

REFERENCES: SHERFF, E. E. 1936. Revision of the genus *Coreopsis*. Field Mus. Nat. Hist., Bot. Ser. 11:279–475.
 —. 1955. *Coreopsis*. In N. L. Britton et al., N. Amer. fl., ser. ii. 2:4–40.

1. ***Coreopsis mutica* DC., Prodr. 5:571. 1836.**

— TYPE: Mexico, “Tlapujahua [Tlapujahua],” F. W. Keel s.n. (BR).

All Chiapan specimens of this species are referable to:

1a. ***Coreopsis mutica* DC. var. *microcephala* D. J. Crawford, Brittonia 22:109. 1970.**

— TYPE: Mexico, Chiapas, ca. 4 miles [6 km] east of Trinitaria on route 190, 23 Sep 1966, T. Melchert et al. 6453 (IA; isotype: RM).

ILLUSTRATION: Fig. 10.

Shrubs, to 3 m high, stems terete, glabrous or hairy; leaves subsessile or, more commonly, basally narrowed into slightly winged petioles, blades simple (rarely 3-lobed?), lanceolate to ovate-attenuate, mostly 6–18 cm long, 2–5 cm wide, margins remotely serrate, abaxial faces variously hairy, sometimes glabrescent, sometimes glaucescent, adaxial faces often darker; heads (3–)6–30+ in corymbiform to paniculiform clusters at ends of branches; peduncles mostly 2–3+ cm long, very slender to rather stout, very hairy or glabrous, mostly arising from axils of linear to spatulate bractlets 4–15+ mm long; involucre turbinate to campanulate, 6–12 mm high; outer phyllaries 2–5, linear to narrowly spatulate, often spreading, greenish, herba-

ceous, hairy or glabrous, the inner 5–8, pale green to stramineous, golden, or purplish, broader, linear-ovate, erect, membranaceous, mostly glabrous; paleae similar to inner phyllaries but narrowly elliptic to linear; ray florets 5(4–6), corollas golden yellow, linear to ovate, 12–20 mm long; disc florets mostly 10–20, corollas dull yellow (contrasting with black anthers), 5–6 mm long, tubes a little shorter and much narrower than the throats, lobes 5, deltate-ovate, ca. 0.7 mm long, often reflexed; style branches with slender penicillate appendages; cypselae blackish to stramineous, strongly ob-flattened, elliptic and concave (outer) to nearly linear (innermost), narrowly winged, ca. 5–7 mm long; pappi none; $2n = 56$; flowering mostly Sep–Dec.

Wooded slopes, streambanks, roadcuts, etc. in Montane Rain, Tropical Deciduous, Pine-Oak-*Liquidambar*, and Pine-Oak forests; rare in Northern Highlands and W Sierra Madre, common on Central Plateau; 750–2800 m. Southern Mex. (Chis.), Guat., Hond., Salv. CHIAPAS COLLECTIONS: *Cro* 46517 (MO, UC); *Crq* 9675 (TEX); *Crq* 10482 (DS, TEX); *H&L* 4178 (TEX); *Jack* 216 (TEX); *RMK* 2813 (DS, TEX, UC); *RMK* 3082 (DS, TEX, UC); *Lan* 802 (TEX); *L* 428 (DS); *L* 1510 (DS); *L* 2253 (DS); *L* 2458 (DS); *L* 2521 (DS); *RM* 417 (CAS); *Neff* 93-4-15-9 (TEX); *SI* 2338 (TEX); *T* 33 (DS); *T* 1111 (DS, LL); *T* 1409 (DS); *T* 1488 (DS, LL); *T* 1542 (DS); *T* 3087 (DS); *T* 9345 (TEX); *We* 12940 (LL); 7279; 7305; 7323; 7356; 7878; 7994; 9438; 9473; 12402; 13214; 13847; 20354; 20481; 22876; 27753; 28896; 31451; 41010; 41378; 48050; 53050; 53206; 70612.

15. COSMOS

Cosmos Cav., Icon. 1:9. 1791. — TYPE: *Cosmos bipinnatus* Cav.
 For synonymy, see Sherff (1932, 1955).

Perennial or annual herbs, rarely suffrutescent, some to 2 m high, often rhizomatous or with tuberiform roots; leaves opposite, mostly 1–3-pinnatifid or pinnate, rarely not divided; heads borne singly or very loosely aggregated in corymbiform to paniculiform clusters; peduncles mostly long, usually ebracteolate, sometimes scapiform; involucre narrowly cylindric to hemispheric or broadly crateriform; phyllaries heteromorphic, the outer mostly 5–8, herbaceous, usually narrower and shorter than the inner, the inner 5–8, more membranous, often striate and scarious-margined; receptacles flat; paleae usually resembling inner phyllaries, narrower, sometimes apically subulate-attenuate; ray florets typically 5 or 8 (rarely none), neuter, corollas usually rosy pink to purplish, sometimes white or coppery orange, rarely truly yellow, laminae usually broadly ligulate to obovate, truncate or 3-toothed; disc florets mostly (10–)20–80+, bisexual, fertile, corollas usually brownish to white or translucent proximally, yellow distally, tubes very narrow, shorter than the funnellform-dilated throats, lobes 5, equal, broadly to narrowly deltate, often papillate within; filaments hairy just proximal the anthers; style branches hispidulous-dilated beyond the stigmatic lines, each usually with a slender, hispidulous appendage; cypselae fusiform to linear, usually very slender, somewhat sinusoid, apically attenuate, usually quadrate in cross section at widest point, faces often sulcate, often hispid, especially distally; pappi none or of 1–8 awns, the awns usually retrorsely barbed; $x = 12, 17$.

Twenty-five to thirty or more species centered in Mexico; some long used in horticulture and frequently encountered worldwide as waifs. The genus is very closely related to *Dahlia*.

REFERENCES: SHERIFF, E. E. 1932. Revision of the genus *Cosmos*. Publ. Field Columbian Mus., Bot. Ser. 8:401–447.
 —. 1955. *Cosmos*. In N. L. Britton et al., N. Amer. fl., ser. ii. 2:130–146.

- a. Perennials; leaves 1-pinnatisect or not divided.
 - b. Leaves or lobes lance-linear to linear-attenuate, 3–10 cm long, 2–4 mm wide, stiffly pungent; peduncles 6–15 cm long, not scapiform 3. *C. crithmifolius*
 - bb. Leaves or lobes mostly spatulate to oblanceolate, 4–8 cm long, 6–20 mm wide, not pungent; peduncles 15–30+ cm long, scapiform 4. *C. diversifolius*
- aa. Annuals; leaves 2–3-pinnatifid.
 - c. Leaves finely divided into filiform lobes mostly less than 2 mm wide; disc florets mostly 40–80 1. *C. bipinnatus*
 - cc. Leaves laciniately divided into lanceolate to linear-attenuate lobes 3–8 mm wide; disc florets mostly 20–40.
 - d. Ray corollas coppery orange to yellow, showy, 15–25+ mm long 5. *C. sulphureus*
 - dd. Ray corollas rosaceous to pink or white, inconspicuous to showy, 10–18 mm long 2. *C. caudatus*

1. *Cosmos bipinnatus* Cav., Icon. 1:10, t. 14. 1791.

— TYPE: Grown in botanical garden at Madrid from Mexican seed (MA).

Cosmos bipinnatus Cav. var. *exaristatus* DC., Prodr. 5:606. 1836. — LECTOTYPE (Sherff 1932:418): Mexico, Michoacán, near Patzcuaro, *A. von Humboldt* and *A. J. A. Bonpland* s.n. (P).

For fuller synonymy, see Sherff (1932, 1955).

ILLUSTRATION: the original.

Annuals, to 2 m high; leaves mostly 3–12 cm long, 2–3-pinnatifid, ultimate divisions linear-filiform, 8–25 mm long, mostly less than 2 mm wide, glabrous but for minutely scabrelous margins; heads borne singly at ends of branches; peduncles mostly 10–20 cm long, ebracteolate; involucre broadly obconic to hemispheric, 8–12 mm high; outer phyllaries mostly 8, lance-attenuate, pale, darkly striate, 4–20 mm long, inner phyllaries mostly 8, ovate to lance-ovate, membranous with scarious margins, mostly 7–12 mm long, shortly connate at base; paleae lance-linear and scarious proximally, attenuate distally into a filiform appendage; ray florets typically 8, corollas rosy pink to lavender-purple or white, laminae broadly ligulate to obovate, mostly 15–30+ mm long; disc florets ca. 40–80, corollas ochroleucous to translucent proximally, becoming bright yellow distally, ca. 6 mm long, tubes ca. 1.5 mm, very slender, throats ca. 3 mm, funnelform-campanulate, lobes lance-triangular to attenuate, ca. 1.5 mm long; filaments glandular hairy; style branches apically hispidulous-dilated; cypselae dark, plump and arcuate to very slender and fusiform-sinusoid, each with a slender beak, glabrous or antrorsely hispidulous, mostly 8–15 mm long including beak; pappi none or of 2–3, retrorsely barbed awns 2–3 mm long; $2n = 24$; flowering Aug–Nov.

Cultivated and adventive, to be expected at 1500–2300 m throughout much of the state. Native from southern United States (Ariz.) through Mex. (Sin., Dgo., Zac., Nay., Jal., Aguasc., Gto., Hgo., Mich., Méx., D.F., Pue., Oax., Chis.) to C.A. (Guat., C.R.). CHIAPAS COLLECTIONS: *GL* 609 (CAS); *L* 2164 (DS); *L* 2315 (DS); *T* 1529 (DS); 22700; 39774; 46028.

2. *Cosmos caudatus* Kunth, Nov. gen. sp., ed. fol. 4:188. 1820 [1818]; ed. qto. 4:240. 1820.

— TYPE: Cuba, near Havana, Mar 1801, *A. von Humboldt* and *A. J. A. Bonpland* s.n. (P).

Cosmos pacificus Melchert var. *chiapensis* Melchert, Phytologia 69:214. 1990. — TYPE: Mexico, Chiapas, rte 190, 50 miles [80 km] east of Oaxaca border, 17 Oct 1971, *T. Melchert* et al. 71-161 (TEX; isotypes: IA, MEXU).

For fuller synonymy, see Sherff (1932, 1955).

ILLUSTRATION: Fig. 11.

Annuals, to 2+ m high; leaves roughly deltate in outline, mostly 8–15+ cm long, raggedly bipinnatisect into narrowly lanceolate to linear-attenuate lobes mostly 1–3 cm long, 3–8 mm wide, glabrous but for margins and veins; heads scattered at ends of branches; peduncles 7–15 cm long, 0–2-bracteolate; involucre broadly turbinate, 7–10 mm high; outer phyllaries mostly 8, linear-attenuate, dark green, 6–11 mm long, obscurely striate with 1–3 nerves, free to base or connate ca. 1 mm, inner phyllaries ca. 8, often purplish, linear ovate, membranous, 6–10 mm long; paleae narrow, membranous, becoming scarious on drying, mostly 6–10 mm long, apically blunt; ray florets 8, corollas reduced and inconspicuous or well developed, rosaceous to pink or white, 10–18 mm long; disc florets 20–40, corollas ochroleucous at base, yellow distally, ca. 7 mm long, tubes ca. 2 mm long, gradually expanding, throats funnelform, ca. 4 mm long, lobes ovate-triangular, densely ciliolate; filaments sparsely glandular hairy; style branches dilated with multicellular hairs and a subulate appendage; cypselae gray to black, very slender, fusiform-attenuate, slightly sinusoid, 9–28+ mm long including beak, antrorsely hispid; pappi none or of 2(–3), erect, divergent, or reflexed, retrorsely barbed awns 2–5 mm long; $2n = 24, 48$; flowering Aug–Oct.

Shrubby or grassy slopes, steep banks, and disturbed places in Evergreen Seasonal, Tropical Deciduous, and Pine-Oak forests; uncommon on Central Plateau and in Central Depression, rare on Pacific Coastal Plain; 600–1350 m. Rare in Fla.; Mex. (Tam., Sin., Jal., Cma., Mich., Yuc., Chis.), through C.A. and Antill. into S.A. (Col., Ven., Guy., Sur., Ecu., Bol., Braz., Parag.); adventive in Old World. CHIAPAS COLLECTIONS: *L* 2161 (DS); *EM* 17496 (DS); *P* 6685 (UC); 13373; 20185; 28066; 28377; 29101; 46007; 46661; 52798.

3. *Cosmos crithmifolius* Kunth, Nov. gen. sp., ed. fol. 4:190. 1820 [1818]; ed. qto. 4:242. 1820.

— TYPE: Mexico, Michoacán, "Valladolid de Mechocan,"

Sep 1803, *A. von Humboldt and A. J. A. Bonpland s.n.* (P).

For synonymy, see Sherff (1932, 1955).

ILLUSTRATION: Ann. Missouri Bot. Gard. 62:1189. 1975 [Fl. Pan.].

Perennial herbs, to ca. 1 m high, sometimes suffrutescent, from slender to stout rootstock; leaves 5–15 cm long, blades not divided or pinnatisect into 3–7 lance-linear to linear-attenuate, stiffly pungent lobes mostly 3–10 cm long, 2–4 mm wide, glabrous or nearly so; heads widely scattered; peduncles very slender, 6–15 cm long, ebracteate; involucre turbinate, 7–10 mm high; outer phyllaries ca. 8, lance-linear, 3–9 mm long, obscurely nerved, inner phyllaries ca. 8, ovate to lance-ovate, mostly 7–12+ mm long, membranous, striate, scarious-margined; paleae linear, becoming scarious on drying, obtuse; ray florets mostly 5, corollas deep purple to rosy pink, laminae broadly cuneate-obovate, mostly 15–25+ mm long; disc florets ca. 20–30, corollas ochroleucous proximally, yellow distally, 7–8 mm long, tubes ca. 1.5 mm, throats gradually dilated, ca. 5 mm long, lobes lance-ovate, ca. 1.5 mm long, very papillate within; filaments hairy; style branches purplish with attenuate, hispidulous appendages; cypselae blackish brown to purplish, slender, fusiform to weakly sinusoid, \pm beaked, mostly 9–16 mm long overall, minutely antrorsely hispidulous; pappi of 3–5, unequal, retrorsely barbed, erect, spreading, or divergent awns 1.5–5.5 mm long; flowering Jul–Nov.

Rocky, grassy or wooded slopes in Evergreen Cloud, Evergreen Seasonal, Pine-Oak-*Liquidambar*, and Pine-Oak forests; common in Northern Highlands and on Central Plateau, uncommon in Eastern Highlands and W Sierra Madre; 850–2800 m. Mex. (Chih., N.L., Sin., S.L.P., Nay., Jal., Gto., Mich., Tlax., Ver., Gro., Oax., Chis.), Guat., Hond., Nic., Pan. CHIAPAS COLLECTIONS: *C 359* (DS); *C 391* (DS); *L 1513* (DS); *L 2121* (DS); *L 2578* (DS); *EM 4776* (LL); *Och 4357* (CAS); *PL 1043* (CAS); *P 9093* (UC); *R&R&M 1087* (LL); *SC 725* (CAS, TEX); *SR 1043* (TEX); *T 1330* (DS); *T 1509* (DS); *T 2688* (DS); *T 2763* (DS); *Z 269* (DS); *11835*; *14040*; *26386*; *27065*; *28702*; *37962*; *39657*; *40779*; *41044*; *41316*; *47063*; *51663*; *52425*; *52457*; *55653*.

4. *Cosmos diversifolius* Otto in G. B. Knowles and F. Westcott, Fl. cab. 2:3, pl. 47. 1838.

— LECTOTYPE (Sherff 1932:443): the original plate.

For synonymy, see Sherff (1932, 1955).

ILLUSTRATION: original plate.

Herbaceous perennials, often somewhat scapiform, mostly 3–5+ dm high, from deep-seated, tuberiform roots; leaves simple or pinnate (on same plant), petioles of the simple slender, narrowly winged, blades mostly spatulate to oblanceolate, 4–8 cm long, 10–20 mm wide, the pinnate leaves with 3–5+ lobes or leaflets, mostly 6–12 cm long overall, the divisions spatulate to oblanceolate, all glabrous or nearly so, often with reddish nerves reminiscent of some *camissonias*; heads scattered; peduncles scapiform, mostly 15–30+ cm long beyond the most distal leaf or bract; involucre broadly turbinate, 7–12 mm high; outer phyllaries 8, pale green with darker nerves, lanceolate to ovate, 5–9+ mm long; inner phyllaries similar but darker and more membranous, mostly 8–10 mm long; paleae drying char-

taceous, equalling inner phyllaries; ray florets 8+, corollas usually pink to purplish, sometimes white, laminae broadly ligulate to obovate, 16–25+ mm long; disc florets 30–60+, corollas brownish to ochroleucous proximally, yellow distally, 5–7 mm long, tubes dark, 1–2 mm long, throats pale, ca. 3.5 mm long, lobes lance-deltate, ca. 1.5 mm long, minutely papillate within; filaments glandular hairy; style branches apically hispidulous-dilated, rounded; cypselae brownish gray to buffy, slender, fusiform and weakly sinusoid, attenuate but not truly beaked, mostly 9–12+ mm long, glabrous; pappi of 2–3, tawny, retrorsely barbed awns 1–2 mm long; flowering Jul–Oct.

Rocky or grassy slopes in Pine-Oak-*Liquidambar* and Pine-Oak forests; common in E Northern Highlands, on Central Plateau, and in W Central Depression; 1400–2600 m. Eastern and southern Mex. (N.L., Tam., Dgo., S.L.P., Mich., Pue., Oax., Chis.), Guat. CHIAPAS COLLECTIONS: *C 152* (DS); *GL 528* (CAS, TEX); *GL 542* (CAS, TEX); *GS 334* (CAS); *Jo 2012* (TEX); *RM 540* (CAS); *RM 545* (CAS); *M&L 385* (CAS); *M&L 540* (CAS); *SR 994* (CAS, TEX); *T 965* (DS); *T 1039* (DS, LL); *We 17989* (UC); *11274*; *11959*; *12447*; *12619*; *12968*; *40792*; *46349*; *51301*; *51943*; *52012*.

5. *Cosmos sulphureus* Cav., Icon. 1:56, t. 79. 1791.

— TYPE: Grown in botanical garden at Madrid from Mexican seed (MA).

Cosmos sulphureus Cav. var. *exaristatus* Sherff, Publ. Field Columbian Mus., Bot. Ser. 8:411. 1932. — TYPE: Mexico, Chiapas, Sierra de Tonalá, Sep 1913, *C. A. Purpus* 6793 (UC!; isotypes: F, GH, NY, US).

For additional synonymy, see Sherff (1932, 1955).

ILLUSTRATION: see protologue.

Annuals, to 2 m high; leaves deltate to broadly lanceolate in gross outline, mostly 7–18+ cm long, raggedly 2(–3)-pinnatisect into narrowly lanceolate lobes mostly 3–8 mm wide, mostly glabrous but for veins and margins; heads terminal on upper branches; peduncles slender, mostly 8–15 cm long, narrowed proximal to the heads, remotely bracteolate or ebracteolate, often sparsely hairy; involucre broadly turbinate to shallowly hemispheric; outer phyllaries mostly 8, lance-linear, 5–8 mm long, herbaceous, obscurely nerved, inner phyllaries ca. 8, lance-ovate, 7–12 mm long, membranous, scarious-margined; paleae similar to inner phyllaries, narrower, becoming chartaceous on drying; ray florets 8+, corollas coppery orange (rarely yellow), showy, the laminae broadly ligulate to obovate, mostly 15–25+ mm long; disc florets ca. 30, corollas brownish to ochroleucous proximally and yellow to orange distally, 6–7 mm long, tubes slender, ca. 1.5 mm long, throats dilated, funnelform, ca. 3.5 mm long, lobes lance-ovate, ca. 1.5 mm long, internally papillate to hairy; filaments hairy; style branches hispidulous, dilated and subulate-appendaged; cypselae blackish, slender, fusiform, often sinusoid and apically attenuate into a beak, mostly 12–20+ mm long overall, antrorsely hispidulous; pappi of 0–3, often fragile, soon falling, fine, divergent, retrorsely barbed awns 3–5+ mm long; $2n = 24, 48$; flowering Oct.

Meadows and brushy slopes, sometimes ruderal on outwash plains, roadsides, etc.; much cultivated and perhaps mostly adventive in Chis., where found in Tropical Deciduous and Evergreen Seasonal forests; uncommon in Central Depression,

in Sierra Madre, and on Pacific Coastal Plain; 650–1950 m. Nearly pantropic; apparently native to central and southern Mex.; now established in southern U.S. (Tex., Fla.), virtually throughout Mex. (Son., Sin., Dgo., Nay., Jal., Aguasc., Cma.,

Mich., Méx., Mlos., Oax., Chis.), C.A. (Guat., Salv., C.R., Pan.); Antill.; northern S.A. (Col., Guy., Braz.); Old World tropics. CHIAPAS COLLECTIONS: *Calz* 3853 (TEX); *SI* 2364 (TEX); *SI* 2383 (TEX); 13547; 28376; 38131; 40583.

16. DAHLIA

Dahlia Cav., Icon. 1:56. 1791. — LECTOTYPE (Sherff 1955:46): *Dahlia pinnata* Cav.
For synonymy, see Sorensen (1969).

Herbaceous perennials or shrubs, mostly 5–20(–90) dm high, usually from tuberiform roots, one an epiphytic vine; leaves opposite, rarely whorled, simple (not divided) or 1–3 times pinnately divided, the compound leaves often stipulate; heads borne singly or loosely associated in 2's, 3's, or more; peduncles usually 10+ cm long; involucre broadly turbinate to cylindric, mostly 10–25 mm high; phyllaries heteromorphic, the outer 5(4–8), erect to spreading or reflexed, usually fleshy, the inner mostly 8, erect, membranous, somewhat connate at base; receptacles flat; paleae similar to inner phyllaries; ray florets mostly 8, to 100+ in pluriserial cultivars, neuter or styliferous and sterile, corollas usually large and showy, lavender to purple, pink, white, scarlet, orange, or yellow, laminae usually broadly ligulate to obovate; disc florets ca. 20–180, mostly bisexual (innermost often functionally staminate), corollas yellow to reddish or purple, sometimes bicolored, often delicate and drying translucent, tubes shorter and narrower than the throats, often hairy at juncture, lobes 5, equal, deltate to attenuate; filaments glabrous; style branches hispidulous with deltoid to long, subulate appendages; cypselae grayish to tan, reddish, or black, ob-compressed or -flattened, linear to spatulate in face view, often striate, sometimes minutely tuberculate or puberulent, rarely scarious-margined; pappi none or of 2–5 rudimentary teeth; $x = 16$.

Sorensen (1969) recognized 27 species, all centered in highlands of southern Mexico and Central America, two extending adventively into South America. *Dahlia* is closely allied with *Cosmos* and *Hidalgoa*. Dahlias are much prized horticulturally.

REFERENCES: HANSEN, H. V. and J. P. HJERTING. 1996. Observations on chromosome numbers and biosystematics in *Dahlia* (Asteraceae, Heliantheae) with an account of the identity of *D. pinnata*, *D. rosea*, and *D. coccinea*. Nordic J. Bot. 16:445–455; SHERFF, E. E. 1955. *Dahlia*. In N. L. Britton et al., N. Amer. fl., ser. ii. 2:45–59; SORENSEN, P. D. 1969. Revision of the genus *Dahlia* (Compositae, Heliantheae–Coreopsidinae). Rhodora 71:309–365, 367–416.

- a. Ray corollas yellow to orange or scarlet.
 - b. Outer phyllaries mostly 7–15 mm long; ray florets mostly uniserial, corollas mostly orange to scarlet, rarely yellow, (15–)25–40 mm long 2. *D. coccinea*
 - bb. Outer phyllaries 12–18 mm long; ray florets mostly pluriserial, corollas yellow to reddish, often with cyanic tinge, 35–60+ mm long 4. *D. pinnata*
- aa. Ray corollas white or pink to lavender or purple.
 - c. Largest leaves 30–50(–90) cm long; heads mostly (3–)5–9+ together; outer phyllaries usually hairy on inner faces 3. *D. imperialis*
 - cc. Largest leaves rarely to 35 cm long; heads mostly 1–3 together; outer phyllaries glabrous.
 - d. Leaves all simple; peduncles 5–9 cm long 5. *D. purpusii*
 - dd. Leaves mostly pinnatifid to bipinnate; peduncles 8–20+ cm long.
 - e. Plants mostly 1–2 m high; larger leaves mostly 13–25 cm long; ray florets mostly pluriserial, corollas 35–60+ mm long; cypselae 11–13 mm long 4. *D. pinnata*
 - ee. Plants mostly 4–12 dm high; larger leaves mostly 7–18(–25) cm long; ray florets uniserial, corollas mostly 15–35 mm long; cypselae 7–12 mm long 1. *D. australis*

1. *Dahlia australis* (Sherff) P. D. Sorensen, Rhodora 71:378. 1969.

— *Dahlia scapigera* (A. Dietr.) Link & Otto var. *australis* Sherff, Amer. J. Bot. 34:143. 1947. — TYPE: Mexico, Oaxaca, Cerro de San Felipe, 2500 m, 1 Sep 1897, C. Conzatti and V. Gonzales 543 (GH).

Dahlia australis (Sherff) P. D. Sorensen var. *chiapensis* P. D. Sorensen, Rhodora 71:384. 1969. — TYPE: Mexico, Chiapas, ca. 9 miles [14 km] SE of San Cristóbal de Las Casas,

ca. 7500 ft. [2296 m], 23 Sep 1966, T. Melchert et al. 6458 (IA)

For additional synonymy, see Sorensen (1969).

ILLUSTRATION: Sorensen 1969:385 (*D. australis* var. *chiapensis*).

Herbs, to 12 dm tall, from fleshy roots; mid-stem leaves pinnatifid to bipinnate with usually 3–5 primary divisions, mostly 7–18(–25) cm long overall, leaflet blades mostly rhombic to lance-ovate, sometimes nearly deltate-ovate, mostly 3–5(–8) cm long, 2–3(–5+) cm wide, serrate, abaxial faces often pale or silvery green; heads widely scattered, terminal or

axillary; peduncles 8–15(–20+) cm long beyond the nearest leaf or bractlet, each narrowed just proximal to the erect to nodding head; involucre turbinate to broadly campanulate; outer phyllaries mostly 5–6, reflexed, linear-spatulate to obovate, 6–15 mm long, glabrous, inner phyllaries mostly 8, erect, lance-linear to lance-ovate, 12–18 mm long, connate at very base, membranous; paleae similar to inner phyllaries, more scarious and apically rounded; ray florets usually 8, corollas dark to pale purple or pinkish, 15–35 mm long; disc florets ca. 40–70, corollas yellow to purple, very delicate, drying translucent, 6–9 mm long, tubes shorter and much narrower than the apically contracted throats; cypselae blackish to very dark red, slender, weakly flattened, mostly 7–12 mm long; pappi none or rudimentary; $2n = 32, 64$; flowering Jul–Nov.

Steep, rocky slopes in Evergreen Cloud and Pine-Oak forests; common on Central plateau and rare in SE Sierra Madre; 1370–3000 m. Southern Mex. (Hgo., Oax., Chis.), Guat. CHIAPAS COLLECTIONS: *C&L* 416 (CAS); *L* 2255 (DS); *L* 2456 (DS); *RM* 538 (CAS); *T* 9327 (CAS); 7095; 7307; 13412; 13762; 14041; 22828; 27732; 37340; 40299; 46252; 51831.

Sorensen (1969) recognized four varieties of *D. australis* and referred all Chis. collections to var. *chiapensis*. Two of D. E. Breedlove's Chis. collections (22828 and 40299, both from 3000 m on Cerro Mozotal in SE Sierra Madre) closely approach plants from Guat. called var. *serrator* by Sorensen. These and other of D. E. Breedlove's Chis. collections also closely approach *D. sherffii* P. D. Sorensen from Chih. and Dgo.

2. *Dahlia coccinea* Cav., Icon. 3:33, t. 266. 1796.

— *Georgina coccinea* (Cav.) Willd., Sp. pl. 3:2124–2125. 1803. — *Dahlia pinnata* Cav. var. *coccinea* (Cav.) Voss, Vilm. Blumengärtn. ed. 3. 1:489. 1894. — TYPE: Grown in botanical garden at Madrid from Mexican seed (MA).

For full synonymy, see Sorensen (1969).

ILLUSTRATION: Fig. 12.

Herbs (sometimes suffruticose?), 5–15(–30) dm high; leaves, mostly opposite, sometimes whorled, varying from simple and serrate-dentate to 1–3-pinnate with 3–7(–11) primary divisions, mostly 12–30+ cm long overall, leaflet blades ovate-elliptic to lance-ovate or oblanceolate, mostly 3–8(–12) cm long, 2–4(–7) cm wide, commonly scabrelous to scabrous, rarely glabrous; heads loosely associated in 2's and 3's(–5's); peduncles mostly 8–20(2–50) cm long; involucre plumply turbinate to cylindric; outer phyllaries 5–8, spreading to reflexed, linear-spatulate to obovate, glabrous, mostly 7–15 mm long, inner phyllaries mostly 8, erect, lance-linear to oblong, membranous, 12–28 mm long; paleae membranous to scarious, apically rounded to weakly retuse; ray florets 8, corollas orange to dark scarlet, sometimes yellow, mostly (15–)25–40 mm long; disc florets 70–160, corollas yellowish to scarlet or scarlet-tipped, 8–11 mm long, throats narrowly cylindric; cypselae plumbeous to tan or reddish brown, sometimes mottled or speckled, weakly flattened, clavate to spatulate, sometimes narrowly scarious-margined, 10–16 mm long; pappi none or of 2–5, stout teeth less than 1 mm long; $2n = 32, 64$; flowering Jul–Oct.

Rocky slopes, shaded canyons, and disturbed places in Evergreen Cloud, Pine-Oak-*Liquidambar*, Pine-Oak, and second

growth forests; common on Central Plateau, rare in Central Depression and Sierra Madre; 915–2835 m. Common throughout much of Mex. (Chih., Coah., N.L., Tam., Sin., Dgo., Zac., S.L.P., Nay., Jal., Hgo., Mich., Méx., D.F., Pue., Ver., Gro., Oax., Chis.), Guat., Bel.; reported to be adventive in Peru. CHIAPAS COLLECTIONS: *A* 1284 (DS); *D* 9478 (DS, LL); *GL* 636 (TEX); *GS* 337 (CAS); *GS* 386 (CAS, TEX); *L* 1193 (DS, LL); *L* 1426 (DS); *L* 1488 (DS); *L* 1757 (DS); *L* 1941 (DS); *L* 2076 (DS); *L* 2105 (DS); *L* 2267 (DS); *L* 2439 (DS); *PL* 1064 (TEX); *P* 6667 (UC); *P* 9101 (UC); *SC* 288 (CAS); *SR* 214 (TEX); *SI* 2327 (TEX); *Stall* 6 (TEX); *T* 23 (DS); *T* 1107 (DS); *We* 17966 (UC); 6813; 11342; 11905; 12413; 12510; 12798; 26195; 27996; 46231; 52192; 70116.

3. *Dahlia imperialis* Roezl ex Ortgies, Gartenflora 12:243. 1863.

— TYPE: Grown in botanical garden at Berlin from a Mexican seed source via Zurich (B, destroyed).

For synonymy, see Sorensen (1969).

ILLUSTRATION: none found.

Herbaceous or, more commonly, suffruticose or woody perennials, 2–6(1–9) m high; larger, mid-stem leaves 2–3-pinnate, usually with 11–15 primary divisions, 30–50(–90) cm long overall, leaflet blades mostly lanceolate to lance-ovate, (3–)5–12 cm long, (1–)3–6 cm wide, margins coarsely serrate, apex attenuate; heads mostly (3–)5–9+ together; peduncles mostly 6–10(2–15) cm long, individual heads often nodding; involucre spreading-turbinate to cylindric; outer phyllaries 5(–8), reflexed, oblanceolate to spatulate or obovate, 7–17 mm long, densely appressed-puberulent on inner faces (exceptionally glabrous), inner phyllaries 7–8+, erect, lance-ovate, 16–26 mm long; paleae similar to inner phyllaries; ray florets 8, corollas lavender to purple or white, tubes usually hairy, laminae 30–50(–60) mm long; disc florets 130–170, corollas yellow, sometimes reddish tipped, 8–11 mm long; cypselae gray to brown, nearly linear, striate, glabrous, 9–17 mm long; pappi none or rudimentary; $2n = 32$; flowering mostly Aug–Jan.

Steep brushy or shrubby slopes in Montane Rain, Evergreen Cloud, Pine-Oak-*Liquidambar*, and Pine-Oak forests; rare in Northern Highlands, common on Central Plateau and in SE Sierra Madre; 1050–3500 m. Mex. (Ver., Oax., Chis.), Guat., Salv., C.R., Pan.; S.A. (Col.). To be expected elsewhere as fugitives of cultivation. CHIAPAS COLLECTIONS: *L* 1795 (DS); *L* 2244 (DS); *EM* 4628 (LL); *EM* 5452 (LL); *T* 412 (DS, LL); *T* 1688 (DS); *T* 1740 (DS); *T* 1773 (DS, LL); *T* 1932 (DS); *T* 2109 (DS, LL); *TW* 2383 (TEX); 6814; 7233; 7300; 7424; 8878; 12403; 12575; 12833; 13408; 13750; 14206; 14210; 22589; 29392; 31098; 31151; 31691; 42722; 42775; 47050; 52957; 56812.

On specimens in LL/TEX, B. L. Turner has used the name *D. excelsa* Benth. (in B. Maund, Botanist 2:pl. 88. 1838) for plants I have called *D. imperialis*.

Three of D. E. Breedlove's Chis. collections, all from SE Sierra Madre are exceptional: 29392 (dry slope with *Abies*, *Alnus*, *Buddleia*, *Pinus*, etc. on SE side of Volcán Tacaná, 3500 m) has rather coarse, almost leathery leaves and the plants are said to be only 4 feet high; 31151 (Evergreen Cloud Forest on N and W slopes of

Cerro Mozotal, 3000 m) has remotely toothed leaflets and the inner phyllaries and tubes of ray corollas are glabrous; 24722 (ridge in Evergreen Cloud Forest near Niquivil, 2600 m) has exceptionally small leaflets (3–5 cm long) and these plants, too, are said to be only 4 feet tall.

4. *Dahlia pinnata* Cav., Icon. 1:57, t. 80. 1791.

— LECTOTYPE (Sorensen 1969:359): The original plate.

For synonymy, see Sorensen (1969).

ILLUSTRATION: none found.

Perennial herbs, 1–2 m high; leaves mostly pinnatisect to bipinnate, rarely some leaves simple, rather fleshy or somewhat coriaceous, mostly 13–25 cm long overall, leaflet blades mostly ovate-elliptic to lance-ovate, 5–12 cm long, 2–7 cm wide, base cuneate to truncate, margins coarsely serrate or dentate; heads borne singly or 2–3 together; peduncles mostly 8–15+ cm long; involucre broadly turbinate to broadly bowl-shaped; outer phyllaries mostly 5, spreading to reflexed, linear to spatulate or broadly obovate, 12–18 mm long, glabrous, inner phyllaries mostly 8, erect, broadly lance-linear to ovate, membranous, 17–22 mm long; paleae similar to inner phyllaries; “ray florets” often pluriseriate, corollas mostly purplish to pink or white (commonly with a yellow spot near base), rarely yellow to reddish, then often with cyanic tinge, 35–60+ mm long; disc florets ca. 100–150 (usually 20 to none in some “double” forms), mostly yellow, sometimes purplish, 10–12 mm long, throats broadly cylindric; cypselae not seen, reported to be linear-oblancoolate, 11–13 mm long; pappi apparently none; $2n = 64$; flowering Jul.

In Chis. probably represented only by cultivated plants or escapes, recorded from about habitations on Central Plateau; 1700–2200 m. Widely cultivated and to be expected as locally naturalized ruderals. CHIAPAS COLLECTIONS: *L* 929 (DS); *L* 1334 to 1348 (DS); *SR* 1079 (CAS); 11246; 25992.

Sorensen (1969) applied the name *Dahlia pinnata* Cav. to a species native to Mex. (Hgo., Mex., D.F., Pue., Gro.); that species is now known as *Dahlia sorensenii* H. V. Hansen & Hjerting and the name *D. pinnata* is applied to hybrid cultivars.

5. *Dahlia purpusii* Brandege, Univ. Calif. Publ. Bot. 6:76. 1914.

— TYPE: Mexico, Chiapas, “Cerro del Boquerón,” Sep 1913, *C. A. Purpus* 6680 (UC!; isotypes: GH, MO, NY).

ILLUSTRATION: none found.

“Large perennials” (collectors note); leaves short petiolate to sessile, simple (not divided), blades ovate-elliptic to oblong, 8–12 cm long, 4–7 cm wide, base rounded to broadly cuneate, margins coarsely serrate, apex weakly acuminate; heads apparently borne singly or 2–3 together; peduncles very slender, 5–9 cm long; involucre broadly bowl-shaped; outer phyllaries 5, reflexed, spatulate to obovate, glabrous, 8–12 mm long, inner phyllaries ca. 8, \pm erect, broadly lance-linear to lance-ovate, membranous, 14–17 mm long; paleae similar to inner phyllaries; ray florets ca. 8, corollas apparently purple, 3–4 cm long; disc florets ca. 100+, corollas probably yellow, perhaps tinged distally with purple, ca. 10 mm long; cypselae unknown.

Chiapas endemic; known only from the type, collected fairly high in SE Sierra Madre.

17. DELILIA

Delilia Spreng., Bull. Sci. Soc. Philom. Paris, sér. 3. 10:54, pl. I, t. 2. 1823. — TYPE: *Delilia berterii* Spreng. = *Delilia biflora* (L.) Kuntze.

Elvira Cass. in F. Cuvier, Dict. sci. nat., ed. 2. 30:67. 1824. — TYPE: *Elvira martyni* Cass. [nom. superfl.] = *Milleria biflora* L. = *Delilia biflora* (L.) Kuntze

Meratia Cass. in F. Cuvier, Dict. sci. nat., ed. 2. 30:65. 1824 [nom. superfl., based on type of *Delilia* Spreng.].

Desmocephalum Hook. f., Trans. Linn. Soc. London 20:208. 1847. — TYPE: *Desmocephalum inelegans* Hook. f. = *Delilia inelegans* (Hook. f.) Kuntze = *Delilia repens* (Hook. f.) Kuntze.

Microcoecia Hook. f., Trans. Linn. Soc. London 20:209. 1847. — TYPE: *Microcoecia repens* Hook. f. = *Delilia repens* (Hook. f.) Kuntze.

Erect or prostrate annuals, to 1 m high; leaves opposite, petiolate to sessile, blades lance-ovate to lanceolate, 3-nerved beyond their bases, margins serrate; heads mostly 3–12+ in terminal and axillary, bracteate, subumbellate fascicles; peduncles slender, appressed-strigillose; involucre flattened, disclike, 3–6 mm diam.; phyllaries 2–4, greenish, herbaceous-membranaceous, one rotund, the others obovate to oblanceolate, all basally connate, faces appressed; receptacles less than 1 mm diam.; paleae wanting; ray florets 1(–3), pistillate, fertile, corollas whitish to yellow, inconspicuous, tubes slender, glabrous, laminae narrowly ovate; disc florets 1–4, functionally staminate, corollas whitish, glabrous, tubes slender, about equalling the funnellform throats, lobes (4–)5, lance-deltate; style branches stout, hispiduloso-papillate, attenuate; cypselae blackish, flattened-trigonus, obovate in outline, glabrous or distally minutely puberulent; pappi none; $x = 12$.

Two species generally are recognized: one widespread in Neotropics and one endemic to Galapagos Islands.

REFERENCE: DELPRETE, P. G. 1995. Systematic study of the genus *Delilia* (Asteraceae, Heliantheae). Pl. Syst. Evol. 194:111–122.

1. *Delilia biflora* (L.) Kuntze, Revis. gen. pl. 1:333. 1891.

— *Milleria biflora* L., Sp. pl. 919. 1753. — *Elvira martyni* Cass. in F. Cuvier, Dict. sci. nat., ed. 2. 30:68. 1824 [nom. superfl.]. — *Elvira biflora* (L.) DC., Prodr. 5:503. 1836. — TYPE: Mexico, "Habitat in Campechia" (LINN, 1031.4).

Delilia berterii Spreng., Bull. Sci. Soc. Philom. Paris, sér. 3. 10: 54, pl. 1, t. 2. 1823. — *Meratia sprengelii* Cass. in F. Cuvier, Dict. sci. nat., ed. 2. 30:66. 1824 [nom. superfl.]. — TYPE: Apparently grown in Halle from seed collected in Colombia, "ad flumen S. Magdalenae in America australi inventa," by Bertero (HAL? or P?; the illustration leaves no doubt as to application of the name).

ILLUSTRATIONS: Fig. 13; Ann. Missouri Bot. Gard. 62:1059. 1975 [Fl. Pan.]; Bull. Sci. Soc. Philom. Paris, sér. 3. 10:54, pl. 1, t. 2. 1823; Pl. Syst. Evol. 194:114. 1995.

Herbs, 1–5+ dm high; petioles 3–10 mm long, leaf blades 2–5 cm long, 1–3 cm wide, bases connate to rounded, margins serrate, apices acute to attenuate, both faces scabrellous; peduncles 1–3+ mm long; phyllaries reticulate-nerved, sparsely scabrellous, obscurely crenate, ciliolate; ray corolla tubes ca. 1 mm long, laminae 0.5–1.5 mm long; disc corollas 2–2.5 mm long; style branches ca. 0.3 mm long; cypselae ca. 2–2.5 mm long; $2n = 24$; flowering Aug–Oct.

Disturbed places in Evergreen Seasonal, Tropical Deciduous, and Pine-Oak forests; common in Central Depression, less so on Northern Highlands, on Central Plateau, and in Sierra Madre; 670–1550 m. Mex. (Son., Chih., Dgo., S.L.P., Nay., Jal., Mich., Méx., Ver., Oax., Camp., Yuc., Chis.). Guat., Bel., Salv., Nic., C.R., Pan.; Antill.; S.A. CHIAPAS COLLECTIONS: *Cro* 65021 (CAS); *EM* 4779 (LL); *EM* 6065 (CAS, LL); *R&R&M* 841 (LL); *BV* 61–20 (DS); 11795; 13164; 13342; 13494; 20360; 28661; 37413; 39070; 40524; 46146; 46418; 52169; 52737.

18. DESMANTHODIUM

Desmanthodium Benth., Hooker's Icon. Pl. 12:14. 1872. — TYPE (fide ING): *Desmanthodium perfoliatum* Benth.

Coarse perennial herbs, shrubs, or trees, to 3(–6+) m high; leaves opposite, petiolate (petioles often winged) or sessile, blades mostly ovate to lanceolate, triplinerved near their bases, margins entire or serrate, faces glabrous or puberulent to tomentose; capitulescences of corymbiform or paniculiform arrays or aggregations of bracteate glomerules (second-order heads) of 2–5+ obscurely distinguishable heads, the individual heads sessile or nearly so, the glomerules "pedunculate"; individual "involucre" broadly hemispheric to campanulate or cylindric, often somewhat flattened or triquetrous in cross section, 3–10 mm high, the outer bracts (? phyllaries) 2–5+, herbaceous, becoming scarious on drying, striate-nerved, ovate to lanceolate or spatulate, somewhat navicular, the inner bracts similar but narrower and more scarious; receptacles less than 1 mm diam.; paleae none or not distinguishable from innermost "phyllaries"; pistillate florets 1–3+, enclosed in an inflated or flattened to cucullate, scarious sac (becoming a perigynium), corollas inconspicuous, whitish, tubular, truncate-denticulate or minutely ligulate, glabrous; functionally staminate florets 2–6+, corollas whitish, tubes cylindric, shorter than to longer than the funnellform to campanulate, sparsely pilose throats, lobes 5, subequal, deltate to lance-ovate, often piloso-hispidulous abaxially; styles distally hispidulous, minutely bifid; sterile ovaries becoming clavate; cypselae blackish, obscurely triquetrous or flattened, oblanceolate in silhouette, glabrous, shiny, obscurely ribbed, finely striate, each enclosed in a loose, scario-membranous sac; pappi none; $x = 18$.

Four to 10 species in southern Mexico, Central America, and northern South America.

REFERENCE: TURNER, B. L. 1996. Revision of *Desmanthodium* (Asteraceae). Phytologia 80:257–272.

- a. Petioles winged and connate-perfoliate; leaf blades glabrous or nearly so, at most puberulous on nerves 1. *D. perfoliatum*
- aa. Petioles not winged or only very narrowly so, not connate-perfoliate; leaf blades abaxially pilose to tomentose, adaxially scabrellous 2. *D. tomentosum*

1. *Desmanthodium perfoliatum* Benth., Hooker's Icon. Pl. 12:15, tab. 1116. 1872.

— TYPE: Mexico, Oaxaca, 4500 ft. [1371 m], *H. Galeotti* 2050 (K).

Flaveria perfoliata Schultz-Bip. ex Klatt, Leopoldina 23:146. 1887. — LECTOTYPE (Turner 1996:266): Mexico, "Cumbre de Estepa[Estepa]," *F. M. Liebmann* 482 (GH; isolecotype: C).

Desmanthodium caudatum S. F. Blake, J. Wash. Acad. Sci. 28:188. 1938. — TYPE: Chiapas, Escuintla, Finca Juárez, 12 Aug 1937, *E. Matuda* 1750 (US).

ILLUSTRATION: Hooker's Icon. Pl. 12: tab. 1116. 1872.

Shrubs or trees, to 3(–6) m high; stems puberulous, hairs usually in lines; petioles 2–8 cm long, winged, 6–25 mm wide, connate-perfoliate, leaf blades lanceolate to lance-ovate, 6–20+ cm long, 3–12 cm wide, bases continuous with petiole wings, margins subentire to serrate, apices acuminate to attenuate, abaxial faces pale, glabrous or puberulent on nerves, adaxial faces darker, glabrous; capitulescences corymbiform or paniculiform masses of 15–60(–150) glomerules of 2–5+ heads, the whole 7–15(–25+) cm across; "peduncles" 1–3 cm long; "involucre" broadly campanulate to narrowly cylindric or urceolate, 5–7(–10) mm high, the "phyllaries" green, herbaceous (becoming stramineous or brownish and scarious), ovate to lance-ovate, often acuminate, glabrous or nearly so; pistillate florets 1–2(–+?), corollas ochroleucous, 1–1.5 mm long, trun-

cate-denticulate; functionally staminate florets 2–6(–+?), corollas ochroleucous, tubes narrowly cylindric, 1–1.5 mm long, glabrous, throats funnelliform, 0.8–1.2 mm long, sparsely pilosohispidulous, lobes ovate-deltate, 0.7–1.2 mm long, abaxially pilosohispidulous; styles 3.5–4 mm long; sterile ovaries ultimately 3.5–5 mm long; cypselae 2.5–3 mm long; pappi none; flowering Jul–Oct.

Usually in damp places in Evergreen Seasonal, Tropical Deciduous, Pine-Oak-*Liquidambar*, and Pine-Oak forests; locally common on Central Plateau, less so in Northern Highlands, on Central Depression, and in Sierra Madre; 800–2200 m. Mex. (Méx., Oax., Chis.). CHIAPAS COLLECTIONS: *H&F 4179* (TEX); *He 1088* (TEX); *L 1529* (DS); *L 1948* (DS); *L 2156* (DS); *EM 1750* (US); *EM 1756* (US); *R&R&M 991* (LL); *RT 41301* (DS); *T 1104* (DS, LL); *T 2703* (DS, LL); *7078*; *11220*; *11756*; *12073*; *13162*; *26862*; *27277*; *37157*; *39685*; *40723*; *46396*; *46765*; *52180*; *53236*.

2. *Desmanthodium tomentosum* Brandegee, Univ. Calif. Publ. Bot. 6:73. 1914.

— TYPE: Chiapas, Cerro Boquerón, Sep 1913, C. A. Purpus 6683 (UC!).

Desmanthodium congestum Arriagada & Stuessy, Brittonia 42:283. 1990. — TYPE: Chiapas, San Vicente [near Tapachula], 500 m, Aug 1938, E. Matuda 2508 (GH; isotypes: F, NY, US).

ILLUSTRATION: none found.

Shrubs, 2–3 m high; stems brunneous-lanate; petioles 3–7 cm long, only narrowly and distally, if at all, winged, leaf blades

deltate to ovate, 12–18 cm long, 6–14 cm wide, bases abruptly cuneate, margins subentire to dentate, apices acuminate, abaxial faces pilose to tomentose, densely so on nerves, adaxial faces scabrellous; capitulescences corymbiform or paniculiform masses of 30–100+ glomerules of 3–5+ heads each, the whole 10–25 cm across; “peduncles” 3–12(–25) mm long; “involucres” cylindro-campanulate, 1–6 mm high; “phyllaries” green to stramineous, ovate to lanceolate, oblanceolate, or spatulate, mostly obtuse, glabrous or sparsely pilosulous; pistillate florets 1–3, corollas ochroleucous, tubular-cylindric, 1.5–2.5 mm long, denticulate or minutely ligulate, glabrous; functionally staminate florets 2–6+, corollas ochroleucous to white, the nerves orange, tubes 0.8–1.2 mm long, glabrous, throats campanulate, 1–1.5 mm long, sparsely pilose, lobes lance-ovate, 1.1–1.4 mm long, abaxially sparsely pilose; styles 3.5–4.5 mm long; sterile ovaries ultimately 3–4 mm long; cypselae 2.5–5 mm long; pappi none; flowering mostly Sep–Nov.

Steep slopes in Montane Rain Forest; uncommon in SE Sierra Madre; 500–2200 m. Mex. (Chis.), Guat. CHIAPAS COLLECTIONS: *EM 2508* (F, GH, NY, US); *P 6683* (UC); *Vi 864* (TEX); *29482*; *47691*; *55768*.

Arriagada and Stuessy (Brittonia 42:283–285. 1990) reported the type locality of *D. congestum* to be from the northern edge of the Northern Highlands. I am confident that the San Vicente of *Matuda 2508* is the one on the southwestern slopes of Volcán Tacaná (see Amer. Midl. Naturalist 44:594. 1950) and that the type of *D. congestum* is conspecific with that of *D. tomentosum*.

19. DYSSODIA

Dyssodia Cav., Descr. pl. 202. 1802. — TYPE: *Tagetes papposa* Vent. = *Dyssodia papposa* (Vent.) Hitchc.

Syncephalantha Bartl., Ind. Sem. Hort. Goett. 6. 1836; Linnaea 12:80. 1838. — TYPE: *Syncephalantha decipiens* Bartl.

= *Dyssodia decipiens* (Bartl.) M. C. Johnst.

For fuller synonymy see Strother (1969, 1987).

Strong-scented, annual or perennial herbs, 1–3(–9) dm high; leaves mostly opposite, sometimes alternate distally, blades pinnatifid into linear to linear-cuneate or oblanceolate lobes, faces glabrous or variously pubescent, bearing oil-filled, pellucid glands submarginally and/or scattered in laminae; heads usually borne singly (second-order heads comprising 6–8 individual heads in *D. decipiens*) on bracteolate peduncles, sometimes sessile; a calyculus of 1–9 bractlets usually subtending each involucre; involucre proper hemispheric to turbinate or cylindric, 4–10 mm high; phyllaries 4–12 in 1(–2) series, free to base or nearly so, usually bearing oil-filled, pellucid glands; receptacles flat to conic, variously fimbriate to finely setose; paleae none; heads usually radiate; ray florets mostly 5, 8, 13 (none or 1–2 in *D. decipiens*), pistillate, fertile, corollas yellow to orange; disc florets 10–80+, bisexual, fertile, corollas usually dull yellow, sometimes tipped with crimson or purple, tubes and throats about equal or tubes shorter, lobes 5, equal to unequal, deltate to lance-deltate; style branch appendages papillate, rounded-truncate to shortly deltate; cypselae stoutly obpyramidal to obconic, glabrous or pubescent; pappi of 15–20, unequal to subequal squamellae, each squamella comprising 5–10 basally connate bristles; $x = 13$.

Four species; mostly in xeric habitats in Mexico and Guatemala; one species (*D. papposa*, q.v.) ranges from southern Canada through Mexico and Central America into South America.

REFERENCES: STROTHER, J. L. 1969. Systematics of *Dyssodia* Cavanilles (Compositae: Tageteae). Univ. Calif. Publ. Bot. 48:1–88; ———. 1986. Renovation of *Dyssodia* (Compositae: Tageteae). Sida 11:371–378.

- a. Heads simple; ray corollas inconspicuous, laminae 1.5–3 mm long 2. *D. papposa*
 aa. Heads gathered in second-order heads of 1 central plus 5–7 peripheral heads forming a pseudo-head; ray corollas showy, laminae 6–9 mm long 1. *D. decipiens*

1. *Dyssodia decipiens* (Bartl.) M. C. Johnst., *Rhodora* 64:13. 1962.

— *Syncephalantha decipiens* Bartl., Ind. Sem. Hort. Goett. 6. 1836; Linnaea 12:80. 1838. — TYPE: Mexico; apparently grown in Goettingen from seeds collected by Karwinski, probably in Oax. (?GOET; tracing by Klatt in GH!).

Syncephalantha[us] *sanguinea*[us] Klatt, Leopoldina 25:106. 1889. — *Dyssodia sanguinea* (Klatt) Strother, Univ. Calif. Publ. Bot. 48:25. 1969. — TYPE: "Hab. Guatemala et Costarica, leg. v. Warszewicz, No. 87." (?CP; drawing by Klatt in GH!).

Syncephalantha[us] *macrophylla*[us] Klatt, Leopoldina 25:108. 1889. — TYPE: "Culta in hort. bot. Berol." (?CP; drawing by Klatt : GH!).

ILLUSTRATION: none found.

Annuals or short-lived perennials, to 5 dm high, erect to spreading; leaves mostly opposite, sometimes alternate distally, to 55 mm long, pinnatifid into 5–15, linear-cuneate to oblanceolate, coarsely toothed lobes, faces glabrous or strigose, variously dotted with pellucid glands; peduncles mostly 2–10 cm long, bearing 1–2 reduced leaf-like bracts; "heads" each comprising a central discoid head surrounded by 5–7 peripherally radiate heads; individual heads with calyculus of 1–5 bractlets and 4–5 broadly obovate phyllaries free nearly to base, bractlets and phyllaries bearing pellucid glands; ray florets 0–2 per head, corollas yellow to yellow-orange, laminae broadly elliptic, 6–9 mm long; disc florets 14–30 per head, corollas yellow-orange, 3–4 mm long; cypselae obpyramidal, black, silky pubescent to subglabrous, 2.5–4 mm long; pappi of ca. 20 squamellae, each squamella comprising 5–10, basally connate bristles to 4 mm long; $2n = 26$; flowering mostly Oct–Nov.

Xeric to wet scrublands and open places, sometimes ruderal, in Montane Rain, Evergreen Seasonal, Tropical Deciduous, Pine-Oak-Liquidambar, and Pine-Oak forests and in Savanna; common on lower Central Plateau, in Central Depression, and in Sierra Madre; 850–1700 m. Southern Mex. (Oax., Chis.), Guat. CHIAPAS COLLECTIONS: *Cro* 64911 (UC); *RMK* 3445 (TEX); *Lm* 3737 (US); *EWN* 3452 (GH, US); *EWN* 3489 (US); *P* 362 (GH); *SI* 2366 (TEX); *Sund* 2410 (TEX); *Sund* 2469 (TEX); *T* 3149 (DS, LL); *Tor* 1742 (MICH); 7945; 11317; 13112; 13264; 13653; 14141; 20559; 21777; 28420; 38802; 40615; 46420; 52732; 54896; 56632.

Although there are two modes in variation of habit, leaf shape, peduncle length, and phyllary vestiture, I now judge variation among these characters over the range of these plants to be too great for continued recognition of two species (cf. Strother, 1969).

2. *Dyssodia papposa* (Vent.) Hitchc., Trans. Acad. Sci. St. Louis 5:503. 1891.

— *Tagetes papposa* Vent., Descr. pl. nouv. 36. 1801. — TYPE: United States, Illinois, *A. Michaux s.n.* (P!).

For additional synonymy, see Strother (1969).

ILLUSTRATION: Cronquist, A., et al. 1994. Intermountain Fl. 5:127.

Annuals, to 4(–7) dm high; leaves mostly opposite, blades 15–30(–50) mm long, pinnatisect into 11–15, linear to lanceolate, entire or toothed lobes, faces glabrous or sparsely pubescent, dotted with pellucid glands; heads sessile or shortly pedunculate; calyculus of 4–9 bractlets subtending each involucre; involucre proper turbinate to campanulate, 6–10 mm high; phyllaries 8(6–12), often reddish, ovate to oblanceolate, free to base or nearly so, each bearing 1–7 pellucid glands; ray florets 8 or fewer, corollas inconspicuous, yellow-orange, laminae ovate to elliptic, mostly 1.5–3 mm long; disc florets 12–50, corollas dull yellow, ca. 3 mm long; cypselae obpyramidal, subsericeous, ca. 3 mm long; pappi of ca. 20, unequal squamellae, each squamella comprising 5–10, basally connate bristles to ca. 3 mm long; $2n = 26$; flowering mostly Oct–Nov.

Ruderal in Evergreen Cloud, Pine-Oak-Liquidambar, and Pine-Oak forests; common in Northern Highlands, in Eastern Highlands, and on Central Plateau; 1100–2700 m. Southern Can. south through U.S. (Plains and Rocky Mts.) and cen. Mex. (Chih., Coah., N.L., Tam., Dgo., Zac., S.L.P., Jal., Aguasc., Gto., Qro., Hgo., Mich., Méx., D.F., Pue., Oax., Chis.), Guat.; adventive in eastern U.S. and in S.A. (Arg., Bol.). CHIAPAS COLLECTIONS: *Chit* 52 (TEX); *GL* 158 (TEX); *GL* 476 (CAS, TEX); *GG* 159 (CAS); *RMK* 2860 (DS, MICH, NY, TEX, UC, US); *RMK* 3010 (MICH, TEX, UC); *Lan* 806 (TEX); *L* 65 (DS); *L* 2371 (DS); *Lo* 517 (CAS, TEX); *Prat* 1106 (TEX); *SR* 215 (CAS); *SR* 1087 (CAS, TEX); *SI* 2096 (TEX); *SI* 2107 (TEX); *SI* 2116 (TEX); *SI* 2121 (TEX); *SI* 2125 (TEX); *SI* 2151 (TEX); *RT* 41548 (DS); *T* 1223a (DS); *T* 1471 (DS, LL); *T* 9428 (CAS); *Z* 20 (DS); 7292; 7293; 13302; 14133; 21296; 29204; 38739; 40987; 47074; 49411; 53879.

20. ECLIPTA

Eclipta L., Mant. pl. 2:157, 286. 1771. nom. cons. — TYPE: (cons.): *Eclipta alba* (L.) Hassk. = *Verbesina alba* L. = *Eclipta prostrata* (L.) L.

Eupatoriophalacron Mill., Gard. Dict., abr. ed. 4. 1754. — TYPE: None designated; = *Eclipta* L. fide ING.

Micrelium Forssk., Fl. aegypt.-arab. 152. 1775. — TYPE: *Micrelium tolak* Forssk. [fide ING]. = ?*Eclipta prostrata* (L.) L.

Paleista Raf., New Fl. 2:43. 1836. — TYPE: *Paleista flexuosa* Raf. = *Eclipta prostrata* (L.) L.

Herbs, annual or perennial, mostly less than 5 dm high; leaves opposite, sessile or petiolate, blades mostly lanceolate, margins serrate to subentire, faces usually scabrous to scabrellous; heads terminal and axillary on slender, ebracteolate peduncles; involucre mostly hemispheric, less than 5 mm high; phyllaries 8–12+ in 2(–3) series, subequal; receptacles flat to convex; paleae linear to filiform; ray florets ca. 20–40 in 2(–3) series, pistillate, fertile, corollas white to pale yellow, inconspicuous; disc florets ca. 15–30, bisexual, fertile, corollas whitish, tubes much shorter than the ampliate throats, lobes 4–5, often minutely hairy; style branches very short, minutely hispidulous; cypselae dark brown, compressed or flattened, weakly 3–4-angled, usually tuberculate or rugose; pappi minute coronas or of 2, very short teeth; $x = 11$.

Two to four (perhaps only one) species; apparently of American origin; now virtually pantropical.

1. *Eclipta prostrata* (L.) L., Mant. pl. 2:286. 1771.

— *Verbesina prostrata* L., Sp. pl. 902. 1753. — *Eleutheranthera prostrata* (L.) Schultz-Bip., Bot. Zeitung (Berlin) 24:239. 1866. — TYPE: "Habitat in India"; 1020.4 or 1920.5 in LINN?

Verbesina alba L., Sp. pl. 902. 1753. — *Eclipta erecta* L., Mant. pl. 2:286. 1771 [nom. superfl.]. — *Eclipta alba* (L.) Hassk., Pl. jav. rar. 528. 1848. — TYPE: "Habitat in Virginia, Surinamo"; apparently 1020.1 ex Hort. Cliff. in LINN.

Wedelia psammophila Poepp., Nov. gen. sp. pl. 3:50. 1845 [1843]. — TYPE: "Crescit in insulis saepe inundatis arenosis fluminis Amazonum circum Coary," E. F. Poeppig s.n. (W; isotype: NY!).

Other names proposed in *Eclipta* may be applicable to this taxon.

ILLUSTRATION: Fig. 14.

Herbs, annual or persisting, much branched, sprawling to erect, stems to 3(–7+) dm long, sometimes rooting at proximal nodes; leaves petiolate to subsessile, blades lance-ovate to narrowly lanceolate or nearly linear, 2–5(–10) cm long, (4–)8–30+ mm wide, margins remotely serrate, at least distally,

faces scabrous to closely scabrelous; heads terminal and axillary; peduncles mostly 5–40 mm long; involucre shallowly bowl-shaped to subhemispheric; phyllaries mostly 8–12 in 2 series, lanceolate to lance-ovate, subequal, 2–5 mm long, scabrelous; receptacles convex; paleae linear to filiform, ca. 2 mm long, hispidulous distally; ray florets 20–40 in 2–3 series, corollas whitish, very slender, ca. 2 mm long; disc florets 15–30, corollas whitish, tubes ca. 0.3 mm long, throats 0.8 mm long, lobes 4, deltate, ca. 0.4 mm long; style branches very short, distally minutely hispidulous; cypselae blackish brown, compressed or flattened, weakly 3–4-angled, ca. 2.5 mm long, rugose or tuberculate; pappi minute coronas or of 2, short teeth; $2n = 22$; flowering sporadically the year round.

Roadside ditches, pond margins, and similar places in Tropical Rain, Lower Montane Rain, and Tropical Deciduous forests and in Mangrove Swamps; rare (or overlooked) in Northern and Eastern highlands, Central Depression, and Sierra Madre and on Pacific Coastal Plain; 3–1700 m. Widespread; scattered from southern Calif. north and east to southern Ont. and Mass., south and east to Fla. and through most of Mex. (Baja C., Baja C. S., Son., Chih., N.L., Tam., Sin., S.L.P., Nay., Jal., Cma., Mich., Méx., Ver., Gro., Oax., Yuc., Chis.) and C.A. to S.A. (Arg.); Old World. CHIAPAS COLLECTIONS: *Mz 9031* (TEX); *Mz 11012* (TEX); *Mz 11063* (TEX); *T 6024* (UC); *T 7467* (TEX); *20836*; *21346*; *26406*; *28617*; *34278*; *37356*; *49230*.

21. ESPEJOA

Espejoa DC., Prodr. 5:660. 1836. — TYPE: *Espejoa mexicana* DC.

Annuals, erect to spreading, to 6+ dm high; leaves opposite, sessile; heads borne singly on terminal or axillary, rather long, ebracteolate peduncles; involucre narrowly campanulate to hemispheric, ca. 1 cm high; phyllaries mostly 8–12, imbricate in 2–3 series, broadly elliptic to orbicular; receptacles flat, weakly foveolate; paleae none; ray florets none; disc florets mostly 6–10, corollas yellow to orange or red, tubes basally dilated and much thickened, a little shorter than the dilated throats, lobes 5, lance-linear; style branches minutely papillate-hispidulous, obtuse-rounded; cypselae narrowly obpyramidal, 5-angled to somewhat compressed, evenly hirsute to sericeous; pappi of 12–16, crowded, ovate to lanceolate, unicostate, erose or weakly aristate squamellae; $x = 9$.

Monotypic.

1. *Espejoa mexicana* DC., Prodr. 5:660. 1836.

— *Jaumea mexicana* (DC.) Hemsl. in F. Godman and O. Salvin, Biol. cent.-amer., Bot. 2:209. 1881. — TYPE: Mexico, "ad Divum-Dionysium" (Oaxaca?), Sep, L. *Alaman* (G-DC, microfiche!).

ILLUSTRATION: Fig. 15.

Annuals, mostly 3–6+ dm high; leaf blades oblanceolate, mostly 4–8 cm long, somewhat clasping at their bases, apices minutely apiculate, faces sparsely puberulent, sometimes glabrescent, margins ciliolate with fine, multicellular hairs;

peduncles mostly 3–9 cm long; phyllaries green to purple, unequal, the outer shorter, all membranous to scarious, longitudinally striate-nerved, often apiculate; corollas stout, ca. 5 mm long, lobes adaxially sparsely villous with multicellular hairs; cypselae 6–8 mm long, blackish with whitish to rufous pubescence; pappus scales tawny to whitish, mostly 2–3 mm long; $2n = 18$.

Fields or wooded slopes in Tropical Deciduous and Pine-Oak forests and in Mangrove Swamps; uncommon in W Sierra Madre and on Pacific Coastal Plain; 3–1000 m. Southern Mex. (Oax., Chis.), Guat., Hond., Salv., Nic., C.R. CHIAPAS COLLECTIONS: *P 9302* (DS, UC); *20604*; *20777*; *28307*; *47916*; *52722*.

22. FLAVERIA

Flaveria Juss., Gen. pl. 186. 1789. — LECTOTYPE (Johnston 1903): *Flaveria chilensis* J. F. Gmel. = *Flaveria bidentis* (L.) Kuntze.

For synonymy, see Powell (1978).

Annual or perennial herbs, or, rarely, suffrutescent, shrubs, or trees, mostly less than 1(–4) m high; leaves opposite, petiolate or sessile, sometimes connate, blades mostly linear to elliptic, margins entire or dentate, faces mostly glabrous, sometimes puberulent or even subcanescent; heads borne in axillary or terminal, corymbiform to scorpioid clusters or dense glomerules, pedunculate or sessile on a common "receptacle"; involucre proper narrowly cylindric to obpyramidal, 3–5(–7) mm high, often subtended by 1–3 bracteoles; phyllaries 1–5(–8), equal to subequal, lance-linear to narrowly elliptic; receptacles \pm flat; paleae none ("receptacles" of the glomerules usually setose); ray florets none or 1(–2) per head, pistillate, fertile, corollas mostly yellow, laminae usually inconspicuous (sometimes whitish); disc florets 0–15, bisexual and fertile (sometimes functionally staminate?), corollas yellow, tubes often glandular-puberulent, about equalling the funnelliform to campanulate throats, lobes 5, equal, mostly deltate-ovate; style branches truncate, minutely papillate and dilated; cypselae mostly obovate to clavate, somewhat compressed, 8–10-ribbed, glabrous; pappi usually none (rarely crowns of connate squamellae or of 2–4, minute, free squamellae); $x = 18$.

About 21 species centered in southern and western United States, Mexico, and West Indies; one species extending into Central America, one in South America, and one in Australia; some taxa adventive in Old World.

REFERENCE: POWELL, A. M. 1978. Systematics of *Flaveria* (Flaveriinae-Asteraceae). Ann. Missouri Bot. Gard. 65:590–636.

1. *Flaveria trinervia* (Spreng.) C. Mohr, Contr. U.S. Natl. Herb. 6:810. 1901.

— *Oedera trinervia* Spreng., Bot. Gart. Halle 63. 1800. — TYPE: Cultivated in botanical garden at Halle? (P?; Powell (1978) reported "not seen"; use adopted here is consistent with established usage).

For additional synonymy, see Powell (1978).

ILLUSTRATION: none found.

Annuals, erect, usually much branched, to ca. 1(–2) m high; leaves petiolate or sessile, often connate, blades mostly lance-elliptic with 3 primary nerves from near their bases, 3–6(–15) cm long, margins subentire or distally serrate, faces glabrous; heads densely congested in sessile glomerules (second order heads) 5–25 mm across; involucre narrowly cylindric or some-

what flattened, 3–4 mm high, often subtended by 1–3, slender bracteoles; phyllaries 1–2, linear-elliptic, folded, subscarios, striate, glabrous, falling with cypselae; "ray" florets 0–1 per individual head, pistillate, fertile, corollas yellow, laminae whitish, ca. 0.5 mm long; disc florets 0–1, bisexual and fertile (or functionally staminate?), corollas yellow, ca. 2 mm long; cypselae black, shiny, subclavate, somewhat flattened, ca. 2.5 mm long; pappi none; $2n = 36$.

Ruderal, usually in wet, disturbed places in Evergreen Seasonal and Tropical Deciduous forests; rare in Central Depression; 1050–1170 m. Eastern and southern U.S. (Ariz., Fla., Mass., Mo., N. Mex., Tex.) south through much of Mex. (Son., Chih., Coah., N.L., Tam., Dgo., Zac., S.L.P., Jal., Aguasc., Gto., Qro., Hgo., Méx., D.F., Mlos., Tlax., Ver., Gro., Oax., Camp., Yuc., Chis.), Bel., and Antill. into S.A.; adventive in Old World. CHIAPAS COLLECTIONS: T 3138 (DS); 46452.

23. FLORESTINA

Florestina Cass. in F. Cuvier, Dict. sci. nat., ed. 2. 17:155. 1820. — TYPE: *Florestina pedata* (Cav.) Cass. \equiv *Stevia pedata* Cav.

Herbs, erect, annuals or short-lived perennials, mostly 1–5 dm high, usually strigose to hispidulous and/or glandular-puberulent throughout or nearly so, rarely glabrescent; leaves opposite proximally, alternate distally, petiolate, simple or palmately divided, blades or lobes broadly deltate or cordate to ovate, lanceolate, or linear, margins entire or variously dentate or crenate; capitulescences loosely cymiform or paniculiform; involucre subhemispheric to obconic, mostly 3–10 mm high; phyllaries mostly 5, 8, or 12 in 1(–2) series, green to purple, equal to subequal, narrowly obovate to rotund, thin, margins somewhat scarios, often ciliolate distally; receptacles concave to convex; paleae none, receptacles sometimes minutely setose or with knob-like enations; ray florets none; disc florets mostly 8–60, corollas white to purplish, tubes shorter than the short throats, lobes 5, rather long, often unequal, lance-triangular to deltate; style branches with subulate, hispidulous appendages; cypselae obconical to obpyramidal-quadrate, blackish, smooth or ribbed, usually with coarse, straight to curly, white hairs; pappi of 8–10 squamellae, all alike or alternate ones alike, variously erose-truncate or rounded to coarsely uniaristate; $x = 10, 12$.

Eight species ranging from Chihuahua and Texas south through central and eastern Mexico into Central America.

REFERENCE: TURNER, B. L. 1963. Taxonomy of *Florestina* (Helenieae, Compositae). Brittonia 15:27-46.

- a. Leaf blades mostly pedate with linear to narrowly ovate lobes; florets mostly 8-20 per head 2. *F. pedata*
 aa. Leaf blades cordate to deltate; florets mostly 20-60 per head.
 b. Involucres mostly 7-10 mm high; corollas 4-7 mm long; cypselae 3.5-5.5 mm long; pappus squamellae
 ca. 2.5 and 6 mm long 1. *F. latifolia*
 bb. Involucres mostly 5-7 mm high; corollas 2.5-3 mm long; cypselae 3-4 mm long; pappus squamellae 1-2
 mm long 3. *F. platyphylla*

1. *Florestina latifolia* (DC.) Rydb. in N. L. Britton et al., N. Amer. fl. 34:58. 1914.

— *Palafoxia latifolia* DC., Prodr. 5:125. 1836. — *Polyp-teris latifolia* (DC.) Hemsl. in F. Godman and O. Salvin, Biol. cent.-amer., Bot. 4:59. 1886. — TYPE: Mexico, Oaxaca, Tehuantepec, Aug. G. Andrieux 286 (G-DC, microfiche!).

ILLUSTRATIONS: Fig. 16; Brittonia 15:32. 1963.

Mostly 30-60 cm high; petioles 5-45 mm long, leaf blades deltate to cordate, 27-75 mm long, 22-62 mm wide, margins sharply dentate to crenate; peduncles slender, mostly 15-35 mm long, bracteolate or not; involucres broadly turbinate to hemispheric, 7-10 mm high; phyllaries 5-8, green to dark purple, oblanceolate to nearly rotund, evenly hispidulous and sparsely glandular-puberulent; florets mostly 30-60, corollas pale to deep purple, 4-7 mm long, tubes shorter than the cylindrical throats, lobes unequal, lance-triangular to lance-linear, ca. 0.5-2.5 mm long; cypselae black-purple, narrowly obpyramidal-quadrate, 3.5-5.5 mm long, smooth to striate, usually densely to sparsely covered with coarse, straight to curly, white hairs, rarely glabrescent; pappus usually of 8 squamellae, all alike and broadly lanceolate to ovate or 4 obovate to spatulate ca. 2.5 mm long alternating with 4 lance-acuminate, aristate to 6 mm long, all basally and medially indurate, otherwise translucent-scarious; $2n = 24$; flowering Aug-Dec.

Brushy slopes, thickets, and roadsides in Tropical Deciduous Forest, Savanna, and Thorn Woodlands; uncommon in Central Depression, rare in W Sierra Madre; 800-950 m. Eastern and southern Mex. (Oax., Chis.), Guat., Hond., Nic. CHIAPAS COLLECTIONS: RMK 3442 (DS, TEX, UC); P 9111 (F, GH, MO, NY, UC, US); SI 2274 (TEX); SI 2276A (TEX); 13654; 30491; 36581; 36684; 47926; 52755.

2. *Florestina pedata* (Cav.) Cass. in F. Cuvier, Dict. sci. nat., ed. 2. 17:155. 1820.

— *Stevia pedata* Cav., Icon. 4:33. 1797. — TYPE: Grown in Spain from Mexican seed (MA?; possible isotype: F). *Schkuhria viscosissima* Standl. & Steyer., Publ. Field Mus. Nat. Hist., Bot. Ser. 22:318. 1940. — *Florestina viscosissima* (Standl. & Steyer.) Heiser, Ann. Missouri Bot. Gard. 32:278. 1945. — TYPE: Guatemala, Quiché, near Sacapulas, 1040-1240 m, 12-14 Jan 1939, P. C. Standley 62513 (F).

For fuller synonymy, see Turner (1963).

ILLUSTRATION: Brittonia 15:38. 1963.

Mostly 30-50 cm high; petioles mostly 6-15 mm long, leaf blades palmately divided into (1-)3-5+ linear to lance-linear to narrowly ovate, entire to coarsely dentate lobes mostly 9-30 mm long, 2-5+ mm wide; peduncles very slender, mostly 5-45 mm long; involucres obconic to subhemispheric, mostly 4-5 mm high; phyllaries 5-8+, green to dark purple, oblanceolate, sparsely hispidulous to glabrescent, often ciliolate distally; florets mostly 8-20, corollas creamy white, mostly 2.5-3.5 mm long, tubes shorter than throats, lobes unequal, lance-triangular, longest about as long as tube + throat; cypselae blackish, obconic to obpyramidal, ca. 3 mm long, often with tawny ribs plus coarse, straight to curly, white hairs; pappi of 8, basally indurate, distally scarious-translucent scales ca. 2 mm long; $2n = 20$; flowering Jul-Oct.

Wooded slopes in Tropical Deciduous Forest; common in Central Depression; 500-1170 m. Mex. (Tam., Dgo., S.L.P., Jal., Gto., Qro., Hgo., Mich., Méx., D.F., Mlos., Pue., Ver., Oax., Chis.), Guat. CHIAPAS COLLECTIONS: 11880; 13250; 13522; 20110; 20476; 26238; 37411; 46429.

3. *Florestina platyphylla* (B. L. Rob. & Greenm.) B. L. Rob. & Greenm., Proc. Amer. Acad. Arts 32:49. 1896.

— *Schkuhria platyphylla* B. L. Rob. & Greenm., Amer. J. Sci. 50:156. 1895. — TYPE: Mexico, Oaxaca, Monte Alban, 5500 ft. [1676 m], 8 Oct 1894, C. G. Pringle 4975 (GH; isotypes: MO, NY, UC1, US).

ILLUSTRATION: Brittonia 15:34. 1963.

Mostly 2-5 dm high; petioles 2-12 mm long, leaf blades deltate-ovate, mostly 25-50 mm long, 15-45 mm wide, margins crenate-dentate; peduncles very slender, 6-28 mm long, sometimes bracteolate; involucres broadly turbinate, 5-7 mm high; phyllaries 6-8, dark green or purplish, oblanceolate, sparsely glandular-pubescent and strigoso-hispidulous; florets mostly 20-40, corollas ochroleucous to purplish, 2.5-3 mm long, tubes ca. 0.7 mm long, throats amplate, 1-1.3 mm long, lobes subequal, lance-ovate, ca. 1 mm long; cypselae dull black, narrow, obscurely quadrate, 3-4 mm long, grooved on faces, densely to sparsely hairy; pappi of 8, similar, white to purplish, rotund, proximally indurate, distally scarious, squamellae 1-2 mm long.

In Pine-Oak Forest; rare (?) at edge of Central Plateau/Central Depression; 1600 m. Southern Mex. (Oax., Chis.). CHIAPAS COLLECTION: 47086.

24. FLOURENSIA

Flourensia DC., Prodr. 5:592. 1836. — LECTOTYPE (Blake 1921:394): *Flourensia laurifolia* DC.

Suffrutescent, shrubs, or trees, 3–35(–50) dm high; leaves alternate, distinctly petiolate to subsessile, blades typically lance-linear to ovate, pinnatinerved, margins entire or toothed, faces variously hairy or nearly glabrous, often glutinous or vernicose; heads borne singly or aggregated in corymbiform clusters; peduncles virtually wanting or 1–8(–15) cm long; involucre campanulate to hemispheric, mostly 4–12(–23) mm high; phyllaries 12–40 in 2–5 series, subequal to strongly graded, ovate to lance-linear, often thickened and fleshy, glabrous or hairy, typically glutinous; receptacles nearly flat to conic-ovoid; paleae cartilaginous to scarious, navicular, carinate, apically blunt to acute, typically glutinous; ray florets none or 5–21, neuter or styliiferous and sterile, corollas yellow to golden, tubes very slender, 2–6 mm long, laminae narrowly elliptic to oblong, 7–30 mm long; disc florets 12–100+, bisexual, fertile, corollas yellow, mostly glabrous, often glutinous, 4–7 mm long, tubes much shorter than the ampliate-cylindric or narrowly cylindro-funnelform throats, lobes 5, lance-triangular to deltate; style branches rather slender, acute to attenuate-hispidulous at tip; cypselae blackish, compressed or flattened, oblong to oblanceolate in outline, 5–11 mm long, subglabrous with pilose-ciliate margins or more uniformly pilose-villous; pappi of 2, usually persistent, awn-tipped squamellae, often with laciniolate-setaceous bases; $x = 9$.

Some 31 species, 13 in Mexico and southwestern United States and 18 in South America, usually in arid habitats.

REFERENCES: BLAKE, S. F. 1921. Revision of the genus *Flourensia*. Contr. U.S. Natl. Herb. 20:393–409; DILLON, M. O. 1984. A systematic study of *Flourensia* (Asteraceae, Heliantheae). Fieldiana, Bot. n.s. 16: i–iii + 1–66.

1. *Flourensia collodes* (Greenm.) S. F. Blake, Proc. Amer. Acad. Arts 49:373. 1913.

— *Encelia collodes* Greenm., Proc. Amer. Acad. Arts 39:110. 1903. — TYPE: Mexico, Chiapas, between Ocuilapa and Tuxtla Gutiérrez, 335–915 m, 29 Aug 1895, E. W. Nelson 307 [3071 *vide* Blake and Dillon] (GH; isotype: US).

ILLUSTRATION: Fieldiana, Bot. n.s. 16:23. 1984.

Shrubs, to 3+ m high; petioles 5–20 mm long, leaf blades lance-ovate, rather leathery, mostly 6–12 cm long, 2.5–6 cm wide, bases strongly oblique, apices acute to acuminate, abaxial faces puberulent on veins, otherwise both faces glabrous; heads loosely aggregated in 2s–5s; peduncles 2–8 cm long; involucre broadly hemispheric; phyllaries 30–40 in 3–4 strongly graduated series, the outer lanceolate, 3–5 mm long, much thickened and warty, the inner narrower, lance-linear, 7–10 mm long,

basally cartilaginous, distally more herbaceous but thick and warty, vernicose; receptacles broadly conic-ovoid; paleae stramineous and yellow-resinous or vernicose, chartaceous, navicular, 12–15 mm long, narrowly carinate, apically obtuse-rounded, not persistent; ray florets 12–16, neuter or styliiferous and sterile, corollas yellow, tubes 5–6 mm long, laminae narrowly elliptic, 15–20 mm long; disc florets (30–)80–100, corollas golden yellow, glabrous, tubes 1.5 mm long, throats abruptly ampliate, cylindric, 4.5 mm long, lobes lance-triangular, ca. 1 mm long; style branches 2.5 mm long, shortly attenuate, coarsely hispidulous; cypselae blackish, oblanceolate to spatulate in outline, 8–10 mm long, piloso-ciliate with antrorse hairs ca. 2 mm long; pappi of 2, coarse, awn-tipped squamellae 5–7 mm long, basally laciniolate with 3–9+ subulate to setaceous segments 1–3 mm long; $2n = 36$.

In Tropical Deciduous Forest; rare in Central Depression; 800 m. Southern Mex. (Oax., Chis.). CHIAPAS COLLECTIONS: 20388; 52350.

25. GAILLARDIA

Gaillardia Foug., Observ. Phys. 29:55. 1786. 'Gaillarda'; corr. Mém. Acad. Sci. (Paris) 1786:5. 1788. — TYPE: *Gaillardia pulchella* Foug.

Mostly herbs, annual or perennial, rarely suffrutescent, usually caulescent, mostly less than 1 m high; leaves basal or cauline, alternate, petiolate or, the distal especially, sessile, margins entire or toothed to pinnatifid, faces variously hairy, sometimes glabrescent; heads borne singly on short to quite long peduncles; involucre broadly hemispheric to saucer-shaped at early anthesis, disc mostly 1–2(–3) cm diam. at mid anthesis; phyllaries mostly 15–30 in 2–3 series, ovate to lanceolate or subulate, often chartaceous to indurate at base, commonly shaggy villous with multicellular hairs, becoming reflexed in fruit; receptacles convex to hemispheric, fimbriolate or densely setose with indurate enations; paleae none; ray florets mostly 10–20+, sometimes none, usually neuter, corollas yellow to red or purple, often bicolored, typically cuneate with deeply trifid apex; disc florets mostly 40–80+, bisexual, fertile, corollas pale to bright yellow, often purple or red at tips, sometimes red-purple throughout, tubes much shorter than the abruptly dilated, cylindric to funnelform throats, lobes 5, deltate to lance-ovate or long-acuminate, usually papillate to shaggy-villous with moniliform hairs; style branches variously appendaged, mostly subulate and hairy; cypselae obpyramidal, mostly stout, typically villous; pappi of 5+, usually hyaline, ovate to lanceolate squamellae, each squamella acuminate into a coarse arista or awn; $x = 17$.

About 15–25 species centered in southwestern United States and northern Mexico (two in South America); badly in need of revision.

REFERENCES: BIDDULPH, S. F. 1944. A revision of the genus *Gaillardia*. Res. Stud. State Coll. Wash. 12:195–256; RYDBERG, P. A. 1915. *Gaillardia*. In N. L. Britton et al., N. Amer. fl. 34:131–140; TURNER, B. L. and M. WHALEN. 1975. Taxonomic study of *Gaillardia pulchella* (Asteraceae—Heliantheae). Wrightia 5:189–192.

1. *Gaillardia pulchella* Foug., Mém. Acad. Sci. (Paris) 1786:5. 1788.

— TYPE: Grown in Paris from seed gathered in "Louisiana" (no specimens located; use of this name here is consistent with long-established usage).

For fuller synonymy, see Biddulph (1944); Rydberg (1915). ILLUSTRATION: none found.

Annuals (sometimes perennial), to 7 dm high, spreading to strictly erect; leaves petiolate or sessile and somewhat clasping, blades oblanceolate to linear, 3–10(–20) cm long, margins entire or variously dentate, sinuate, or lobed, faces glandular-punctate and scabrelous, often with scattered, multicellular hairs as well; peduncles 5–20+ cm long; phyllaries lance-linear

to subulate, usually tawny, chartaceous-indurate, and glabrescent at base, distally green, herbaceous, and shaggily hairy; ray florets usually 12–20+, rarely none, neuter, corollas typically reddish purple with yellow tips, sometimes yellow or purple throughout, 1–2(–3) cm long, broadly to narrowly cuneate; disc florets 40–80+, corollas typically pale yellow tipped with purple, ca. 6 mm long, lobes deltate to triangular-attenuate, usually shaggy papillate to villous with purple, moniliform trichomes; cypselae ca. 2 mm long, tawny to rufous with straight hairs to 1.5 mm long borne on proximal half; pappus of 5 aristate squamellae to 4 mm long including awns; $2n = 34$.

Cultivated; may be found as ruderal waif almost anywhere within Chiapas. Native to southern and central United States and northern Mex. (Coah., N.L., Tam.); adventive beyond. CHIAPAS COLLECTIONS: *L* 903 (DS); 16098.

26. GALEANA

Galeana La Llave & Lex., Nov. veg. descr. 1:12. 1824. — TYPE: *Galeana hastata* La Llave & Lex. = *Galeana pratensis* (Kunth) Rydb.

Chlamysperma Less., Syn. gen. Compos. 256. 1832. — TYPE: *Chlamysperma pratense* (Kunth) Less. = *Unxia pratensis* Kunth. = *Galeana pratensis* (Kunth) Rydb.

Annuals, to 4 dm high; leaves mostly opposite, petiolate, blades palmately 3-nerved, mostly deltate to lance-ovate, margins coarsely dentate, faces mostly glandular-puberulent and hirtellous, sometimes glabrescent, minutely glandular-punctate; heads loosely associated, borne on slender, naked, terminal or axillary peduncles; involucre ovoid to cylindric, mostly 3–4 mm high; phyllaries 5, biseriata, broadly elliptic to obovate, concave-carinate; receptacles weakly convex; paleae none; ray florets usually 3, pistillate, fertile, corollas white, laminae minute; disc florets mostly 3–5, bisexual and fertile or functionally staminate, corollas yellow (white?), glandular-puberulent, tubes about twice as long as throats, lobes (4–)5, equal, deltate-ovate; style branches stigmatic virtually to their papillate, deltate-dilated tips; cypselae all blackish, sparsely hirtellous to glabrescent, those of ray florets weakly triquetrous with corky, concave wings on inner angles, those of disc florets 3–4-angled, weakly obpyramidal, wingless; pappi none; $x = 9$.

Monotypic; very close to (perhaps congeneric with) *Villanova* Lag.

1. *Galeana pratensis* (Kunth) Rydb. in N. L. Britton et al., N. Amer. fl. 34:42. 1914.

— *Unxia pratensis* Kunth, Nov. gen. sp., ed. fol. 4:219, t. 401. 1820 [1818]; ed. qto. 4:279. 1820. — *Chlamysperma pratense* (Kunth) Less., Syn. gen. Compos. 256. 1832. — *Villanova pratensis* (Kunth) Benth. in G. Benth and J. D. Hooker, Gen. pl. 2:405. 1873. — TYPE: Mexico, "inter villam Capulae et urbem Valladolid Mexicanorum, alt. 1050 hex. [1890 m]" (protologue), "Patscauro" (label), Sep, A. von Humboldt and A. J. A. Bonpland s.n. (P, microfiche!).

Galeana hastata La Llave & Lex., Nov. veg. descr. 1:12. 1824. — TYPE: Mexico, Veracruz, "S. Jose del Corral," Mar, P. La Llave s.n. (?MA).

Chlamysperma arenarioides Hook. & Arn., Bot. Beech. voy. 300, t. 64. 1837. — *Galeana arenarioides* (Hook. & Arn.) Rydb. in N. L. Britton et al., N. Amer. fl. 34:43. 1914. — TYPE: No specimen cited; the plate is diagnostic.

ILLUSTRATIONS: Fig. 17; see also figures cited in synonymy.

Annuals, strict to spreading, mostly 1–2(–3) dm high, often delicate, much branched distally; petioles mostly 1–3 mm long, leaf blades mostly 1–3 cm long, sometimes hastate, the distal often reduced, elliptic, entire; peduncles 2–8(–17) mm long; phyllaries glandular-punctate and sparsely to densely hirtellous or glandular-puberulent, persistent and reflexed after cypselae drop; laminae of ray corollas orbicular, ca. 0.5 mm long; disc corollas ca. 1.5 mm long; cypselae 2–3 mm long, smooth or tuberculate; $2n = 18$; flowering Jul–Oct.

Disturbed roadsides, streambanks, etc., in Evergreen Seasonal, Tropical Deciduous, and Pine-Oak forests, in Savanna, and in shrubby second growth; common in S Northern Highlands, on Central Plateau, in Central Depression, in Sierra Madre, and on Pacific Coastal Plain; 250–1250 m. Southern Mex. (Nay., Jal., Cma., Mich., Méx., Mlos., Ver., Gro., Oax., Chis.), Guat., Bel., Hond., Salv., Nic., C.R. CHIAPAS COLLECTIONS: *C* 98 (DS); *D* 9576 (LL); *Jks* 7120 (TEX); *LeD*

2212 (DS, LL); *EM* 4483 (LL); *P* 9157 (DS); *R&R&M* 843 (LL); *SI* 2278 (TEX); *SI* 2368 (TEX); *We* 17830 (UC); 6570; 11807; 13721; 13808; 19782; 26357; 26931; 27318; 36631; 37657; 39071; 40026; 40555; 46098; 46656; 52144; 52433; 52738; 52872.

27. GALINSOGA

Galinsoga Ruiz & Pav., Pl. peruv. prodr. 110, tab. 24. 1794. — *Galinsogea* Willd., 1803; *Gallinsoga* J. St.-Hill, 1805; *Galinsoga* Roth, 1806; *Galinsogaea* Zucc., 1821; *Galinzoga* Dumort. 1827 [orthogr. vars.]. — LECTOTYPE (*Roth*, Catal. bot. 3: 78–79. 1806): *Galinsoga parviflora* Cav.

Wiborgia Roth, Catal. bot. 2: 112. 1800, nom. rejic., not *Viborgia* Moench, 1794, nor *Wiborgia* Thunb., 1800, nom. conserv. — TYPE: *Wiborgia acmella* Roth = *Galinsoga parviflora* Cav.

Vigolina Poir. in J. Lamarck, Encycl. 8: 613. 1808 [substitute for *Wiborgia* Roth, 1800]. — TYPE: *Vigolina acmella* (Roth) Poir. = *Wiborgia acmella* Roth = *Galinsoga parviflora* Cav.

Vargasia DC., Prodr. 5: 676. 1836, non Bertero ex Spreng., 1825. — TYPE: *Vargasia caracasana* DC. = *Galinsoga quadriradiata* Ruiz & Pav.

Adventina Raf., New Fl. 1: 67. 1836. — LECTOTYPE (Canne 1977: 335): *Adventina parviflora* Raf. = *Galinsoga parviflora* Cav. *Vasargia* Steud., Nomencl. bot., ed. 2. 2: 745. 1841. — TYPE: *Vasargia caracasana* (DC.) Steud. = *Galinsoga quadriradiata* Ruiz & Pav.

Stemmatella Wedd. ex Benth. in G. Benth. and J. D. Hooker, Gen. pl. 2: 359. 1873. — TYPE: *Stemmatella congesta* Wedd. ex O. Hoffm. = *Galinsoga mandonii* Schultz-Bip.

Annuals, sometimes perennials, rarely woody, usually erect and much branched, to 6–15 dm high; leaves opposite, petiolate or sessile, blades mostly ovate to lanceolate, 3–(5)-nerved from near their bases, faces glabrous or pilose to hirsute; heads scattered in leafy, ± cymiform associations; peduncles slender, 5–50 mm long, often stipitate-glandular; involucre campanulate to hemispheric, mostly 3–6 mm high; phyllaries 6–16 in 1–3 series, herbaceous to membranous, glabrous or closely pilosulous and/or stipitate-glandular, each deciduous together with a ray cypsel and adjacent paleae; receptacles conic; paleae greenish or stramineous, membranous to scarious, broadly ovate to lance-linear, sometimes trilobed, mostly glabrous, often deciduous; ray florets 0–15, pistillate, fertile, corollas showy or inconspicuous, white to pinkish or purplish, tubes stout, pilosulous, laminae ovate to oblong or flabellate, entire or 2–3-lobed; disc florets 5–60(–150), bisexual, fertile, corollas yellow to greenish or purplish, tubes stout, usually pilosulous, shorter than the cylindric to campanulate, pilosulous to glabrous throats, lobes 5, deltate, abaxially papillate or pilosulous; style branches stigmatic almost to their penicillate tips; cypselae blackish, obconic to obpyramidal, glabrous or strigillose to hirsutulous; pappi (may differ in ray and disc) none or of 8–20, truncate-cuneate to spatulate or lanceolate, sometimes aristate, often laciniate or erose-fimbriate squamellae; $x = 8$.

Fifteen or so species native to Neotropics and extending (1–2 spp.) into temperate regions as ruderals; closely allied with *Sabazia*.

REFERENCE: CANNE, J. M. 1977. A revision of the genus *Galinsoga* (Compositae: Heliantheae). *Rhodora* 79: 319–389.

1. *Galinsoga quadriradiata* Ruiz & Pav., Syst. veg. 1: 198. 1798.

— *Galinsoga parviflora* Cav. subsp. (fide Canne 1977) *quadriradiata* (Ruiz & Pav.) Pers., Syn. pl. 2: 472. 1807.

— *Galinsoga parviflora* Cav. var. *quadriradiata* (Ruiz & Pav.) Poir. in J. Lamarck, Encycl. Suppl. 2. 2: 701. 1812. — TYPE: Peru, Lima, Lima and Chancay, 6 Jul–10 Aug 1781, H. Ruiz López and J. A. Pavón s.n. (MA; isotype: ? P).

Wiborgia urticaefolia Kunth, Nov. gen. sp., ed. fol. 4: 201, t. 389. 1820 [1818]; ed. qto. 4: 257. 1820. — *Jaegeria urticaefolia* (Kunth) Spreng., Syst. veg., ed. 16. 3: 590. 1826.

— *Sabazia urticaefolia* (Kunth) DC., Prodr. 5: 497. 1836. — *Baziassa urticaefolia* (Kunth) Steud., Nomencl. bot., ed. 2. 1: 192. 1840. — *Galinsoga urticaefolia* (Kunth) Benth., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 4: 102. 1853. — *Stemmatella urticaefolia* (Kunth) O. Hoffm. ex Hieron., Bot. Jahrb. Syst. 28: 603. 1901. — TYPE: Ecuador, between Mulalo and Pansache, near Marchionis de Miraflores, 1700 hex. [3060 m], Jun 1802, A. von Humboldt and A. J. A. Bonpland 3055 (P, microfiche!).

Vargasia caracasana DC., Prodr. 5: 676. 1836. — *Vasargia caracasana* (DC.) Steud., Nomencl. bot., ed. 2. 2: 745.

1811. — *Galinsoga parviflora* Cav. var. *caracasana* (DC.) A. Gray, Smithsonian Contr. Knowl. 5(6): 98. 1853 [Pl. Wright.]. — *Galinsoga caracasana* (DC.) Schultz-Bip., Bull. Soc. Bot. France 12: 80. 1865. — TYPE: Venezuela, Caracas, 1830, M. Vargas 267 (G-DC, microfiche!; isotype: P).

Galinsoga parviflora Cav. [var.] *hispida* DC., Prodr. 5: 677. 1836. — *Galinsoga hispida* (DC.) Hieron., Notizbl. Königl. Bot. Gart. Berlin 19: 15. 1907, non Benth. 1845. — *Galinsoga quadriradiata* Ruiz & Pav. var. *hispida* (DC.) Thell., Allg. Bot. Z. Syst. 21: 11. 1915. — *Galinsoga aristulata* E. P. Bicknell, Bull. Torrey Bot. Club 43: 270. 1916 [nom. nov. necessitated by *Galinsoga hispida* Benth.]. — TYPE (Canne 1977: 356, without comment, designated specimen at P): Mexico, “in Mexico circa urbem,” 1 Aug 1827, J. L. Berlandier 615 (G-DC, microfiche!; isotype: P).

Adventina ciliata Raf., New Fl. 1: 67. 1836. — *Galinsoga ciliata* (Raf.) S. F. Blake, *Rhodora* 24: 35. 1922, ‘cilata’. — TYPE: Unknown.

Galinsoga bicolorata H. St. John & D. White, *Rhodora* 22: 99. 1920. — TYPE: Mexico, “near Tumbala,” 4000–5500 ft.

[1219–1676 m], 20 Oct 1895, *E. W. Nelson 3356* (GH; isotype: US).

For additional synonymy, see Canne (1977).

ILLUSTRATIONS: **Fig. 18**; *Ann. Missouri Bot. Gard.* 62:1209. 1975; both as *Galinsoga urticifolia* (Kunth) Benth.

Annuals (persisting by layering?), to 3(–6) dm high; petioles 2–30+ mm long, leaf blades thin, herbaceous, ovate or rhomboid-deltate to lance-ovate or lanceolate, 2–6+ cm long, 1–4+ cm wide, bases broadly cuneate to rounded or subtruncate, margins coarsely dentate or crenate to serrate, apices acute to attenuate, faces very sparsely (to densely) hispid with fine hairs mostly 1–2 mm long; heads loosely disposed in open corymbiform associations; peduncles mostly 5–25(–50) mm long, piloso-hirsute or appressed-pubescent and, often, stipitate-glandular; involucre broadly campanulate to hemispheric, mostly 3–5 mm high; phyllaries 6–12+ in 2–3 series, greenish, sometimes purple-tinged, herbaceous-membranous, sometimes with scarious margins, lanceolate to ovate or suborbicular, glabrous or sparsely piloso-hispidulous and/or stipitate-glandular; receptacles conic; paleae greenish-stramineous, scarious-membranous, outer ovate to lanceolate, the inner lance-linear, 2–3.5 mm long, some or all weakly trifid; ray florets 5(4–8), corollas white to pink or maroon or white marked with pink, tubes 0.5–1 mm long, pilosulous, laminae ovate, entire to flabellate and 2–3-lobed, 0.8–2.8 mm long; disc florets 20–40(–65), corollas greenish yellow, sometimes purplish distally, pilosulous proximally or throughout, tubes 0.3–0.6 mm long, throats campanulate, 0.6–1.2 mm long, lobes deltate, 0.3–0.5 mm long; style branches 0.3–0.6 mm long; cypselae blackish, obconic or obpyramidal, 1–2.5 mm long, glabrous or piloso-hirsutulous (those of ray usually shed as a unit with subtending phyllary and

2 adjacent paleae); pappi (sometimes ray or all florets epappose) of 8–20, white to stramineous, cuneate-spatulate to oblanceolate or lanceolate, sometimes aristate, usually finely laciniate or erose-fimbriate squamellae 0.2–1.5 mm long; $2n = 32, 48, 64$; flowering mostly Jul–Oct.

Ruderal, often in damp places in Montane Rain, Evergreen Cloud, Tropical Deciduous, Pine-Oak-*Liquidambar*, and Pine-Oak forests; under foot over much of the Central Plateau, less frequent in Northern Highlands and Sierra Madre, to be expected throughout most of the state; 700–2700 m. Apparently native to Neotropics; long known to be widespread, extending well into temperate latitudes. Mex. (Baja C. S., Chih., Sin., Nay., Jal., Hgo., Mich., Méx., D.F., Mlos., Ver., Gro., Oax., Chis.), Guat., Salv., Hond., Nic., C.R., Pan.; Antilles. CHIAPAS COLLECTIONS: *C 182* (DS); *He 266* (TEX); *He 1089* (CAS); *J 1704* (LL); *Kim 10032* (TEX); *RMK 2991* (DS, TEX); *L 30* (DS); *L 1454* (DS); *L 1769* (DS); *L 2204* (DS); *L 2319* (DS); *L 2503* (DS); *EM 5132* (LL); *Prat 1122* (TEX); *SI 2134* (TEX); *SI 2334* (TEX); *SI 3106* (TEX); *T 12* (DS); *T 408A* (DS, LL); *T 541* (DS, LL); *T 1084* (DS, LL); *T 1235* (DS); *T 1322* (DS); *Ve 1858* (TEX); *6031*; *6237*; *7399*; *9922*; *10724*; *11252*; *12120*; *12316*; *12509*; *12605*; *12775*; *13278*; *27674*; *28647*; *28721*; *39771*; *41280*; *42454*; *42611*; *46104*; *46715*; *49461*; *53878*; *54861*.

Canne (1977) treated polyploid *G. quadriradiata* (1798) as distinct from diploid *G. parviflora* Cav. (1795); the morphological differences between the two are subtle. The two may be conspecific.

28. GOLDMANELLA

Goldmanella Greenm., *Bot. Gaz.* 45:198. 1908. \equiv *Goldmania* Greenm., *Publ. Field Columbian Mus., Bot. Ser.* 2:270. 1907, non *Goldmania* M. Rose ex Micheli, 1903. — TYPE: *Goldmania sarmentosa* Greenm. \equiv *Goldmanella sarmentosa* (Greenm.) Greenm.

Perennials; leaves alternate, sessile or petiolate, blades pedately 5–6-nerved from near the base; heads (3–)5–10+ in umbelliform associations; involucre campanulate, 6–8 mm high; phyllaries 15–22+ in 4–5+ series, unequal; receptacles conic; paleae similar to innermost phyllaries; ray florets 5–8, pistillate, fertile, corollas whitish or pale yellow; disc florets 15–25+, bisexual, fertile, corollas yellow-orange, tube shorter than the narrowly funnelliform throat, lobes 5, deltate; style branches distally deltoid, papillate; cypselae dimorphic: those of rays plumply obcompressed, those of disc \pm terete; pappi none or of 2–3 minute awns.

Monotypic.

1. *Goldmanella sarmentosa* (Greenm.) Greenm., *Bot. Gaz.* 45:198. 1908.

— *Goldmania sarmentosa* Greenm., *Publ. Field Columbian Mus., Bot. Ser.* 2:271. 1907. — *Caleopsis sarmentosa* (Greenm.) Fedde, *Repert. Spec. Nov. Regni Veg.* 8:326. 1910. — TYPE: Mexico, Campeche, Canasayal, 12.5 km above Champotan River, 12 Dec 1900, *E. A. Goldman 448* (syntypes: F, US).

ILLUSTRATION: **Fig. 19**.

Perennials, sprawling, rooting at proximal nodes; stems to 5+ dm long; leaf blades ovate, 3–9+ cm long, 15–60+ mm wide,

bases asymmetric, basiscopically rounded, acroscopically cuneate, margins serrate, apices acute, faces sparsely and finely strigillose to glabrate or glabrous; peduncles very slender, 2–8 cm long, distally bracteolate, the bracteoles intergrading with phyllaries; phyllaries ovate to oblong, membranous, scarious-margined, each streaked with 3–7, reddish or brownish, translucent nerves; ray floret corollas ca. 6 mm long; disc floret corollas ca. 3 mm long; cypselae of ray florets ca. 2 mm long, epidermis grayish, obscurely wrinkled, cypselae of disc florets ca. 3 mm long, epidermis reddish brown, thick, corky, not wrinkled; pappi of ray cypselae of 2–3, divergent, cornute awns 0.1–0.3 mm long, of disc cypselae none or similar to those of ray cypselae.

Known in Chiapas from a single collection: Evergreen Forest; Eastern Highlands; 800 m. Southern Mex. (Camp., Q. Roo,

Chis.), Bel., Guat. CHIAPAS COLLECTION: *J. Menoe et al.* B-525 (MEXU, seen as photocopy).

29. GYMNOAENA

Gymnolaena (DC.) Rydb. in N. L. Britton N. Amer. fl. 34:160. 1915. \equiv *Dyssodia* Cav. sect. *Gymnolaena* DC., Prodr. 5:641. 1836. — TYPE: *Gymnolaena serratifolia* (DC.) Rydb. \equiv *Dyssodia serratifolia* DC.

Shrubs, to 3 m high; leaves usually opposite, sometimes alternate as well, simple, subsessile to short-petioled, blades lanceolate to ovate, margins serrate, sometimes with tiny subulate lobes at base, faces glabrous or puberulent, dotted with pellucid glands; heads borne singly or in cymiform clusters; calyculi of 0–3 inconspicuous bractlets; involucre cylindric, 1–2 cm high, 5–10 mm diam.; phyllaries 5–13, uniseriate, connate nearly or quite to tips, dotted or streaked with pellucid glands; receptacles convex, foveolate, minutely fimbriate; paleae none; ray florets 5–13, pistillate, fertile, corollas showy, yellow to red; disc florets 10–40+, bisexual, corollas narrowly funnelform to cylindric, 9–12 mm long, tubes and throats about equal, tubes puberulent, lobes slender, unequal; style branches with subulate, hispidulous appendages; cypselae obpyramidal, 4–6 mm long, pubescent; pappi of 15–20 squamellae, each squamella comprised of 5–10, unequal, basally connate bristles; $x = 13$.

Three species, restricted to southern Mexico; only one occurs in Chis.

REFERENCE: STROTHER, J. L. 1967. Taxonomy of *Gymnolaena* (DC.) Rydb. (Compositae: Tageteae). *Sida* 3:110–114.

1. *Gymnolaena chiapasana* Strother, *Sida* 3:112. 1967.

— TYPE: Mexico, “Chiapas, etc., ann. 1864–1870,” *A. B. Ghiesbreght s.n.* [519] (BM!; isotypes GH!, MO!, NY!).

ILLUSTRATION: none found.

Shrubs, to 3 m; leaves subsessile, blades lanceolate, mostly 10–15 cm long, 2–4 cm wide, margins sharply serrate, often with 2–4 subulate lobes (3–8 mm long) at base, apex attenuate, faces densely dotted with tiny pellucid glands; peduncles (2–)8–14 cm long, striate, bracteolate, somewhat swollen dis-

tally; involucre 17–20 mm high, 8–10 mm diam.; phyllaries mostly 13, separating irregularly distally, each bearing 11–25 ovate to linear pellucid glands; ray florets mostly 13, corollas orange to brick-red, drying to rose-madder, laminae elliptic, 7–8 mm long; disc florets 30–40+, corollas yellow with reddish lobes, slender, ca. 9 mm long; cypselae ca. 5 mm long; pappi 5–9 mm long; $2n = 26$; flowering Sep–Oct.

Chiapas endemic: Limestone and conglomerate bluffs in Tropical Deciduous Forest; uncommon in Central Depression; 650–900 m. CHIAPAS COLLECTIONS: *G* [519]; *Crq* 11219 (DS, LL); *Lan* 758 (TEX); *Lm* 3837 (US); 28252; 37590; 46503; 48509.

30. HELENIUM

Helenium L., Sp. pl. 886. 1753. — TYPE: *Helenium autumnale* L. *Hecubaea* DC., Prodr. 5:665. 1836. — TYPE: *Hecubaea scorzonrifolia* DC. For additional synonymy, see Bierner (1972).

Herbs, annual, biennial, or perennial, mostly fastigiately branched, to 16 dm high; leaves alternate (some in basal rosettes), mostly sessile, often with bases decurrent onto stems, blades lance-elliptic to linear, margins usually entire, rarely laciniate or pinnatifid, faces glabrous or variously pubescent, usually glandular-punctate; heads borne singly or loosely clustered on terminal, often swollen, fistulose peduncles; involucre rotate to reflexed at anthesis, mostly 1–4 cm across; phyllaries mostly 15–40 in 2(–4) series, mostly lance-linear to subulate, the outer commonly longer than the inner and sometimes basally connate, variously glabrate to densely hairy; receptacles convex to globose to conical; paleae none; ray florets none or 7–40+, neuter or pistillate and fertile, sometimes with staminodes, corollas usually yellow to orange, sometimes reddish brown at bases or throughout, laminae 2–30+ mm long, usually broadly cuneate with 3–5 divergent lobes, commonly shaggily pilose abaxially, glabrous (minutely papillate) adaxially; disc florets to 200+, bisexual, fertile, corollas ochroleucous to yellow, commonly with reddish to purple, pilose tips lending a dark color to the disc, tubes much shorter than the abruptly dilated throats, lobes 4–5, deltate to ovate, often thickened and shaggily pilose; style branches linear, abruptly truncate, papillate-dilated; cypselae stoutly obpyramidal to subcylindric, 4–5-angled to 10–20-ribbed, glabrous or variously hairy; pappi of 5–10, usually hyaline, squamellae, variously erose, laciniate, or aristate, sometimes none; $x = ?$ ($n = 13, 14, 15, 16, 17, 18, 29$).

Perhaps 30 species, mostly in southern and western United States and in Mexico, extending from southern Canada into Central America and represented in South America by a half dozen or so species.

REFERENCE: BIERNER, M. W. 1972. Taxonomy of *Helenium* sect. *Tetrodus* and a conspectus of North American *Helenium* (Compositae). *Brittonia* 24:331–355.

- a. Annuals, branching distally; largest leaves 10–15 cm long 1. *H. mexicanum*
 aa. Perennials, branching basally; largest leaves 2–3 dm long 2. *H. scorzonrifolium*

1. *Helenium mexicanum* Kunth, Nov. gen. sp., ed. fol. 4:235. 1820 [1818]; ed. qto. 4:299. 1820.

— TYPE: "Colitur in hortis Mexicanis," *A. von Humboldt and A. J. A. Bonpland s.n.* (P, microfiche!).

For fuller synonymy, see Bierner (1972).

ILLUSTRATION: McVaugh, R. 1984. *Fl. novo-galiciana*. 12:491, fig. 78.

Annuals (sometimes biennial?), strictly erect, 4–8(–15) dm high, branching distally; leaves sessile with clasping, decurrent bases, blades lance-linear, usually with a single strong nerve, mostly 8–15 cm long, margins mostly entire (the proximal leaves rarely with some short, remote lobes), apices acuminate, faces glabrous or minutely puberulent; heads borne singly or loosely clustered at ends of branches; peduncles densely hairy and somewhat swollen beneath the heads; phyllaries ca. 21 in \pm 2 series, lance-linear, unequal, weakly to strongly connate at their bases, shaggy with multicellular hairs and glandular-punctate; ray florets 11–17, corollas yellow to yellow-orange, laminae broadly cuneate, 5–8(–15) mm long with 3–4 divergent, lance-ovate lobes, abaxially glandular and shaggy-pubescent; disc florets to ca. 200+, corollas pale yellow to ochroleucous with brownish-purple tips, ca. 2.5 mm long, tubes ca. 0.2 mm long, much narrower than the abruptly dilated, cylindric throats, lobes densely shaggy-pilose; cypselae brown, stout, ca. 1.5 mm long, 4–5-nerved, hairy on nerves; pappi of 5–8, round to lanceolate, erose to laciniate, usually uniaristate, hyaline to white squamellae to ca. 0.8 mm long; $2n = 26$; flowering May–Aug.

Moist, often disturbed places in Montane Rain, Pine-Oak-Liquidambar, and Pine-Oak forests; uncommon in Northern Highlands and on Central Plateau; 1650–2200 m. Mex. (Son., Zac., S.L.P., Jal., Qro., Hgo., Mich., Méx., Pue., Oax., Chis.), Guat., Hond., Salv., C.R. CHIAPAS COLLECTIONS: *Alex 1191* (TEX); *RMK 2853* (DS, UC); *RMK 3057* (DS, UC); *EL 5268* (DS); *EM 6023* (LL); *T 9864* (TEX); *Z 320* (DS); 9919; 11970; 14641; 25287; 26495.

2. *Helenium scorzonrifolium* (DC.) A. Gray, Proc. Amer. Acad. Arts 7:359. 1868.

— *Hecubaea scorzonrifolia* DC., Prodr. 5:665. 1836. — TYPE: Mexico, *L. Alaman* (G-DC, microfiche!).

Helenium scorzonrifolium (DC.) A. Gray var. *ghiesbreghtii* A. Gray, Proc. Amer. Acad. Arts 7:359. 1868. — TYPE: Mexico, Chiapas, *A. B. Ghiesbreght s.n.* (GH).

Hecubaea aptera S. F. Blake, Contr. U.S. Natl. Herb. 22:649. 1924. — *Helenium apterum* (S. F. Blake) Bierner, Sida 5:47. 1972. — TYPE: Mexico, Durango, 1000 m, *P. Ibaña García 408* (US).

ILLUSTRATION: none found.

Perennial herbs, branching mostly from their bases, mostly 3–6 dm high from stout, vertical caudices; leaves basal and cauline, the basal narrowly to broadly oblanceolate, gradually tapering to a clasping base, mostly 2–3 dm long, margins entire or distally toothed, stem leaves similar to basal but smaller and sessile with decurrent bases, all with single, strong central nerves, faces glabrous or sparingly puberulent; heads borne singly; peduncles scapiform, apically swollen and densely hairy; outer phyllaries ca. 12–18, lance-ovate, usually connate, and longer than the free, ca. 12–18, inner ones, all sparsely to densely shaggy with purplish, multicellular hairs; ray florets ca. 16, corollas yellow-orange, laminae broadly cuneate, ca. 2 cm long, shaggy-pubescent dorsally; disc florets to 200+, corollas yellow, 3–4 mm long, tubes ca. 0.5 mm long, narrower than the cylindric throats, lobes papillate; cypselae reddish brown, stout, ca. 2.5 mm long, obscurely 10–20-nerved, minutely hirtellous or glabrescent; pappi minute crowns of erose to laciniate scales 0.1–0.5 mm high; $2n = 34$; flowering mostly Jul–Aug.

Bogs, leas, streambanks, etc., in Pine-Oak Forest; locally common on Central Plateau; 1770–2620 m. Western and southern Mex. (Dgo., Jal., Mich., Méx., D.F., Mlos., Chis.), Guat. CHIAPAS COLLECTIONS: *Den 1830* (UC); *GL 543* (TEX); *RMK 2800* (DS, UC); *RMK 2806* (DS, UC); *RMK 2827* (DS, UC); *L 678* (DS); *Lo 445* (TEX); *EM 5849* (LL); *EM 6020* (LL); *Prat 1111* (CAS, TEX); *R&R&M 1085* (LL); *SR 981* (CAS, TEX); *SI 2317* (TEX); *T 1099* (DS); *T 2145* (DS, LL); 6025; 7054; 9207; 10793; 14456; 41833; 51788.

31. HELIOMERIS

Heliomeris Nutt., Proc. Acad. Nat. Sci. Philadelphia 4:19. 1848. — TYPE: *Heliomeris multiflora* Nutt.

Annual or perennial herbs or shrubs, to 10+ dm high; leaves proximally opposite, distally alternate, mostly petiolate, blades narrowly elliptic or lance-linear to linear, margins entire or obscurely toothed, sometimes revolute, faces usually strigillose to strigose and resin-gland-dotted, sometimes ciliolate; heads borne singly or in loose, corymbiform or paniculiform associations; peduncles often bracteate; involucre broadly hemispheric to saucer-shaped, mostly 8–12 mm diam.; phyllaries mostly 12–16 in 2(–3) series, subequal, narrowly lanceolate to lance-linear, mostly herbaceous; receptacles mostly conical; paleae persistent, chartaceous to scarious, navicular, carinate, apices pungent; ray florets 10–16, neuter, corollas yellow to yellow-orange, often with paler tips, tubes stout, laminae narrowly oblong to spatulate; disc florets 60–150+, bisexual, fertile, corollas yellow to yellow-orange, tubes shorter than the abruptly ampliate throats, lobes 5, deltate; filaments glabrous; style branches slender, their appendages deltoid-rounded, minutely hispidulous; cypselae blackish, biconvex or somewhat flattened, obovoid, glabrous; pappi none; $x = 8$.

Three to six species ranging from western and southwestern United States through much of Mexico. Often treated as congeneric with *Viguiera*, q.v.

REFERENCE: YATES, W. F. and C. B. HEISER, Synopsis of *Heliomeris* (Compositae). Proc. Indiana Acad. Sci. 88:364–372.

1. ***Heliomeris longifolia*** (B. L. Rob. & Greenm.) Cockerell, Torrey 18: 183. 1918.

— *Gymnolomia longifolia* B. L. Rob. & Greenm., Proc. Boston Soc. Nat. Hist. 29:92. 1899. — *Viguiera longifolia* (B. L. Rob. & Greenm.) S. F. Blake, Contr. Gray Herb. n.s. 54:111. 1918. — LECTOTYPE (Blake 1918): Texas, “western part,” *C. Wright* “328” (GH).

ILLUSTRATION: none found.

Annuals or, rarely, perennials, 3–10 dm high; petioles 1–5 mm long, leaf blades linear to lance-linear, 4–10(–15) cm long, 3–8(–14) mm wide, bases cuneate, margins entire or remotely denticulate, apices blunt or acute, abaxial faces strigillose and resinous-gland-dotted, adaxial faces more strigose; heads in loose, corymbiform or paniculiform associations; peduncles 2–5(1–12) cm long, each 0–2-bracteolate; involucre broadly hemispheric to saucer-shaped; phyllaries mostly 12–16 in 2 series, subequal, narrowly lanceolate to lance-linear, 4–5(–7) mm long, sparsely to densely closely strigillose; receptacles conical to ovoid, to 3 mm high; paleae white to hyaline, scarious-chartaceous but for a stramineous, more cartilaginous, hairy

carina, 3–4 mm long, abruptly acute, pungent, distally erose-ciliate; ray florets 10–16, corollas golden yellow, often with paler tips, laminae narrowly oblong to spatulate, 7–15(–20) mm long, sometimes conspicuously bifid; disc florets ca. 100–150+, corollas yellow, tubes ca. 0.5 mm long, minutely stipitate-glandular, throats abruptly ampliate, cylindric, ca. 1.5 mm long, with inflated hairs at their bases, lobes lance-deltate, ca. 6 mm long, abaxially hairy like base of throat, adaxially minutely papillate along margins; style branches ca. 0.8 mm long, stigmatic virtually to their minutely hispidulous, deltoid-rounded tips; cypselae blackish, obovoid, somewhat laterally flattened, 1.4–1.8 mm long, glabrous, minutely striate; pappi none; $2n = 16$.

Moist meadows in Pine-Oak Forest; Central Plateau (vicinity of San Cristóbal de Las Casas); 2000–2200 m. Southwestern U.S. (Ariz., N.M., Tex.) and scattered through Mex. (Son., Chih., Dgo., S.L.P., Jal., Mich., Chis.). CHIAPAS COLLECTIONS: RMK 2993 (DS, UC); L 1774 (DS); 7164; 11894; 39900.

The type of *Heliomeris longifolia* may prove to be conspecific with that of *H. multiflora*.

32. HELIOPSIS

Heliopsis Pers., Syn. pl. 2:473. 1807. — TYPE (conserved, cf. Taxon 36:77, 274. 1987): *Heliopsis helianthoides* (L.) Pers. = *Bupthalmum helianthoides* L.

For synonymy, see Fisher (1957).

Annual or perennial herbs, some suffrutices, mostly less than 1 m high; leaves all opposite or the distal alternate, petiolate or sessile, simple, blades orbicular, ovate, deltate, lanceolate, or filiform, margins entire to coarsely serrate, faces glabrous or variously pubescent; heads borne singly on long, ebracteolate peduncles; involucre broadly turbinate to bowl-shaped, mostly less than 1 cm high; phyllaries mostly 12–20 in 2–3 series, the outer often more fleshy and pubescent than the inner, sometimes foliaceous; receptacles low-convex to subconical, often fistulose; paleae becoming chartaceous, weakly persistent, mostly longer than and infolding the cypselae; ray florets usually 5–20, sometimes none, pistillate, fertile, corollas yellow to orange, subcoriaceous, marcescent; disc florets 30–150+, bisexual, fertile, corollas yellow to brown or purple, glabrous, narrowly cylindric, tubes very short, lobes 5, narrowly deltate; style branches slightly dilated and penicillate-appendaged beyond stigmatic areas; cypselae greenish brown to purplish black, weakly 3–4-angled to subterete, rather stout, variously smooth to tuberculate, glabrous or sparsely and minutely puberulent; pappi none or of 2–3 small teeth; $x = 14$.

About a dozen species, all American, ranging from southern Canada, eastern Rockies, and New England to northern Florida, through Arizona, New Mexico, and western Texas, continuing through much of Mexico and Central America into South America.

REFERENCE: FISHER, T. R. 1957. Taxonomy of the genus *Heliopsis* (Compositae). Ohio J. Sci. 57:171–191.

1. ***Heliopsis oppositifolia*** (Lam.) S. Díaz, Revista Acad. Colomb. Ci. Exact. 17:647. 1990.

— *Anthemis oppositifolia* Lam., Encycl. 1:576. 1785, renaming of *Anthemis americana* Mutis ex L. f., Suppl. pl. 378. 1782 [1781], non L., 1753. — *Anthemis occidentalis* Willd., Sp. pl. 3:2185. 1804, superfluous renaming of

Anthemis americana Mutis ex L. f. — *Acmella occidentalis* (Willd.) Rich. in H. C. Persoon, Syn. pl. 2:473. 1807. — *Spilanthes mutisii* Kunth, Nov. gen. sp., ed. fol. 4:164. 1820 [1818]; ed. qto. 4: 209. 1820, superfluous renaming of *Anthemis americana* Mutis ex L. f. — *Heliopsis? dubia* Dunal, Mém. Mus. Hist. Nat. 5:58. 1819, nom. superfl. based on *Anthemis americana* Mutis ex L. f. — *Acmella mutisii* (Kunth) Cass. in F. Cuvier, Dict. sci. nat., ed. 2.

- 24:331. 1822. — *Ceratocephalus americanus* (Mutis ex L. f.) Kuntze, Revis. gen. pl. 1: 326. 1891. — *Spilanthes americana* (Mutis ex L. f.) Hieron., Bot. Jahrb. Syst. 29:42. 1901 [1900]. — *Spilanthes oppositifolia* (Lam.) D'Arcy, Ann. Missouri Bot. Gard. 62:1143. 1975. — *Acmella oppositifolia* (Lam.) R. K. Jansen, Syst. Bot. Monogr. 8:30. 1985. — TYPE: Colombia, 1760–1780, *J. Mutis s.n.* (LINN 1016.32).
- Anthemis bupthalmoides* Jacq., Pl. hort. schoenbr. 2:13, t. 151. 1797. — *Acmella bupthalmoides* (Jacq.) Pers., Syn. pl. 2:473. 1807. — *Heliopsis bupthalmoides* (Jacq.) Dunal, Mem. Mus. Hist. Nat. 5:57. 1819. — TYPE: "Ex patria ignota"; use of this name here is based on the illustration.
- Anthemis ovalifolia* Ortega, Nov. pl. descr. dec. 74. 1800 [1798]. — *Verbesina ovata* Hort. ex Poir. in J. Lamarck, Encycl. 8:454. 1808 [pro syn.]. — TYPE: Grown in Madrid from Peruvian seed sent by Tafalla (?MA).
- Heliopsis canescens* Kunth, Nov. gen. sp., ed. fol. 4:166. 1820 [1818]; ed. qto. 4:212. 1820. — TYPE: Ecuador, "Regno Quitensi," "prope Loxa," *A. von Humboldt and A. J. A. Bonpland s.n.* (P, microfiche!).
- Andrieuxia mexicana* DC., Prodr. 5:559. 1836. — TYPE: Mexico, "ad montem San-Felipe prope Oaxacam," *Andrieux 303* (G-DC, microfiche!).
- Heliopsis pulchra* T. R. Fisher, Ohio J. Sci. 61:178. 1961. — TYPE: Mexico, Chiapas, ca. 5 miles [8 km] northwest of Comitán on route 190, 25 Jun 1960, *R. M. King 3049* (TEX; isotypes: OS, UC!).
- ILLUSTRATIONS: **Fig. 20**; Ann. Missouri Bot. Gard. 62:1098. 1975 [F. Pan.]; both as *Heliopsis bupthalmoides*; see also figures cited in synonymy.

Perennial herbs or suffrutices, to 1 m high; leaves petiolate, blades deltate-ovate to lanceolate, mostly 3–9 cm long, 2–5 cm

wide, margins remotely serrate to subentire, faces glabrous or scabrelous to subvillous; peduncles mostly 8–15 cm long; involucre mostly bowl-shaped to broadly obconical; phyllaries 12–20, obscurely in 2 series, the outer linear to oblanceolate or spatulate, herbaceous, often subvillous. (4–)6–10 mm long, the inner lanceolate to lance-linear, somewhat chartaceous, glabrous or nearly so, a little shorter than the outer; paleae chartaceous, linear, each longer and narrower than the subtended cypselae, obtuse to acute, often purple-tinged distally; ray florets mostly 8–15, corollas bright yellow to pale orange adaxially, paler and often greenish abaxially, linear-ligulate, mostly 15–25 mm long, 4–9 mm wide; disc florets 40–150, corollas yellow to brownish, 4–5 mm long, cylindric, tubes 0.5–0.8 mm long, throats ca. 3 mm long, lobes narrowly deltate; style branches slender, hispidulous-dilated and penicillate-appendaged; cypselae dull greenish brown to purplish black, stout, 3–4 mm long, smooth and shiny or minutely tuberculate, sometimes puberulent as well; pappi none; $2n = 28$, 56; flowering Aug–Nov.

Brushy and wooded slopes, streambanks, etc., in Evergreen Cloud, Pine-Oak-Liquidambar, and Pine-Oak forests; common on Central Plateau, less frequent in Northern and Eastern highlands and in Central Depression; 1300–2750 m. Eastern and southern Mex. (N.L., Jal., Mich., Pue., Ver., Gro., Oax., Chis.), Guat., Hond., C.R., Pan.; S.A. (Col., Ven., Ecu., Peru, Bol.). CHIAPAS COLLECTIONS: *MC 1750* (UC); *C&G 505* (CAS); *C 160* (DS); *Da 9518* (CAS, LL); *GL 500* (TEX); *RMK 3008* (DS, TEX, UC); *RMK 3030* (DS, TEX, UC); *RMK 3049* (UC); *RMK 3102* (DS, TEX, UC); *EM 5620* (CAS, LL); *L 1934* (DS); *SR 1004* (CAS, TEX); *T 1102* (DS); *T 2759* (DS); *I2020*; *14107*; *14150*; *15118*; *26018*; *27255*; *37036*; *39719*; *40769*; *40959*; *46395*; *52219*.

33. HETEROSPERMA

Heterosperma Cav., Icon. 3:34. 1795. — TYPE: *Heterosperma pinnatum* Cav.

Microdonta Nutt., Trans. Amer. Philos. Soc., ser. 2. 7:369. 1841. — TYPE: *Microdonta nana* Nutt. \equiv *Heterosperma nanum* (Nutt.) Sherff.

Annuals, erect to spreading or caespitose, mostly less than 1 m high; sparsely pubescent to glabrate or glabrous; leaves opposite, blades simple and toothed to 1–2-pinnatifid with linear to filiform lobes; heads borne singly; peduncles slender, ebracteolate; involucre mostly cylindric, 4–8+ mm high; phyllaries heteromorphic, the outer linear, erect, herbaceous, often ciliate, the inner narrowly to broadly ovate, membranous, striate with translucent nerves, glabrous, becoming chartaceous; receptacles flat; paleae slender, resembling inner phyllaries; ray florets 2–5(1–8), pistillate, fertile, corollas pale yellow to bright orange, laminae short and inconspicuous to rather large and showy; disc florets mostly 5–20+, bisexual, fertile, corollas pale to bright yellow or orange, tubes slender, shorter than the narrowly funnelform to campanulate throats, lobes 5, equal, deltate; style branches penicillate-appendaged beyond the truncate stigmatic lines; cypselae variable within the head, mostly ob-compressed or -flattened and ranging from (outer) ovate-elliptic with callous margins to (inner) linear, alate, beaked; pappi none (outer cypselae) or of 2(–4) stout, retrorsely barbed awns; $x = 11, 12, 13$.

Perhaps ten species, ranging from western United States through western and southern Mexico into Central America and in temperate South America; adventive (?) in West Indies (Dominican Republic).

REFERENCE: SHERFF, E. E. 1955. *Heterosperma*. In N. L. Britton et al., N. Amer. fl., ser. 2. 2:62–65.

1. *Heterosperma pinnatum* Cav., Icon. 3:34. 1795, 'pinnata.'

— TYPE: Grown in Madrid from Mexican seed (?MA). *Heterospermum* (sic) *tagetinum* A. Gray, Mem. Amer. Acad. Arts, ser. 2. [Pl. Fend.] 4:87. 1849. — TYPE: United

States, New Mexico, San Miguel Co., 12 miles [19 km] west of Las Vegas, Aug 1846, *A. Fendler s.n.* [534] (GH).

ILLUSTRATION: **Fig. 21.**

Annuals, mostly 1–4+ dm high, erect or spreading; leaves mostly 2–5 cm long overall, linear-filiform or 1–2-pinnately divided into 3–9+ linear-filiform lobes, glabrous but for ciliate margins of petiole bases; peduncles very slender, ebracteolate, mostly 1–4 cm long; involucre cylindric at anthesis, becoming globose in fruit, mostly 6–8 mm high; outer phyllaries mostly 2–4, green, herbaceous, linear, erect, ciliate, inner phyllaries mostly 5, often purplish to brownish, membranous, narrowly to broadly ovate, striate, glabrous; paleae similar to inner phyllaries, narrower; ray florets mostly 1–3, corollas pale yellow, inconspicuous, laminae narrowly ovate, ca. 2 mm long; disc florets 8–20+, corollas ochroleucous becoming yellow distally, ca. 2.5 mm long, tubes very slender, 0.7 mm, throats funnel-form, 1.4 mm, lobes deltate, 0.4 mm long; style branches bear-

ing fine, subulate-penicillate, hispidulous appendages; cypselae black, sometimes with buffy wings or margins, ovate-elliptic to narrowly ovate to linear in outline, ob-compressed or -flattened and with in-rolled, callous margins, 5–18 mm long overall, the innermost often linear, attenuate into a slender beak; pappi of 0–3 erect to spreading or reflexed, retrorsely barbed awns 2–3 mm long; $2n = 48, 50$; flowering Oct–Nov.

Ruderal (? adventive) on roadsides and outwash plains in Pine-Oak Forests; uncommon in Eastern Highlands, on Central Plateau, and in E Sierra Madre; 900–2500 m. Southwestern U.S. (Ariz., N.M., Tex.) through western and southern Mex. (Baja C., Baja C.S., Son., Chih., Coah., Dgo., Zac., S.L.P., Jal., Aguasc., Hgo., Cma., Mich., Méx., D.F., Pue., Gro., Oax., Chis.), Guat., Hond. CHIAPAS COLLECTIONS: 13051; 14060; 38738; 40554; 41253; 46047; 46298; 54292; 54966.

34. HIDALGOA

Hidalgoa La Llave & Lex., Nov. veg. descr. 1:15. 1824. — TYPE: *Hidalgoa ternata* La Llave & Lex.

Hidalgoa Less. ex DC., Prodr. 5:511. 1836 [later homonym]. — TYPE: *Hidalgoa lessingii* DC. = *Hidalgoa ternata* La Llave & Lex.

Sprawling, climbing, herbaceous to somewhat woody vines or lianas; leaves opposite, sometimes stipulate, petioles rather long, twining at their bases, blades pedate or pinnate with 3–5+ leaflets, faces glabrous or nearly so; heads mostly borne singly, terminal or axillary; peduncles long, ebracteolate; involucre proper broadly cylindro-campanulate, mostly 7–17 mm high; phyllaries heteromorphic, the outer cycle spreading to reflexed, fleshy-herbaceous, the inner biseriate, erect, membranous, usually paler; receptacles flat; paleae membranous; ray florets mostly 5 or 8(5–12), pistillate, fertile, corollas bright yellow to orange or scarlet, typically large and showy; disc florets bisexual or functionally staminate, corollas yellow to orange, narrowly cylindric, tubes very short, limbs equally to subequally 5-lobed; styles distally hispidulous, undivided or with short branches; cypselae (ray florets only) black to dark green, flattened, elongate to elliptic, apically bicornute (resembling earwigs); pappi none; $x = 15, 16$.

Two or three species ranging from southern Mexico through Central America into northern South America; very closely allied to *Dahlia*.

REFERENCE: SHERFF, E. E. 1955. *Hidalgoa*. In N. L. Britton et al., N. Amer. fl., ser. 2. 2:59–61.

1. *Hidalgoa ternata* La Llave & Lex., Nov. veg. descr. 1:15. 1824.

— *Melampodium?* *hidalgoa* DC., Prodr. 5:521. 1836 [illegit. substitute]. — *Melampodium?* *ternatum* (La Llave & Lex.) DC. ex Stuessy, Rhodora 74:206. 1972. — TYPE: Mexico, Veracruz, not far from San José del Corral, near last cataract of Río Blanco ["prope ultimam cataractum fluminis Blanco, non longae a S. Jose del Corral"], Apr. *P. La Llave s.n.* (?G, ?MA).

Hidalgoa lessingii DC., Prodr. 5:511. 1836 [comb. illegit., generic homonym]. — TYPE: Mexico, Veracruz, "in sylvis Misantlae, in Cuesta-Grande de Yala-Cingo," Dec. C. J. W. Schiede and F. Deppe 1252 (?HAL).

Hidalgoa pentamera Sherff, Fieldiana, Bot. 23:334. 1947. — TYPE: Mexico, Veracruz, Misantla, Aug 1912, C. A. Purpus 5897 (F; isotypes: NY, UC!).

Hidalgoa steyermarkii Sherff, Fieldiana, Bot. 23:335. 1947. — TYPE: Guatemala, Huehuetenango, Sierra de los Cuchumatanes, ca. 17 miles [27 km] north of Barillas, 1500 m, 15–16 Jul 1942, J. A. Steyermark 48814 (F).

Hidalgoa breedlovei Sherff, Sida 2:261. 1960. — TYPE: Mexico, Chiapas, 5 miles [8 km] south of Jitotol, 5600 ft. [1708 m], 11 Feb 1965, D. E. Breedlove 8873 (DS!; isotypes: F, MICH, US).

ILLUSTRATIONS: **Fig. 22**; Ann. Missouri Bot. Gard. 62:1195. 1975 [Fl. Pan.].

Climbing or sprawling vines with twining petioles, stems to 10+ m long; leaves pedately 3–5-foliolate, leaflets broadly lanceolate to rhombic or oblanceolate, often asymmetric, mostly 3–7 cm long, margins remotely toothed, faces glabrous or sparsely hairy on veins and margins; heads borne singly or in 2s or 3s; peduncles mostly 4–15 cm long; involucre 7–10(–15) mm high; outer phyllaries 3–8+, narrowly ovate to linear, dark green, often fleshy, sometimes puberulous, spreading to reflexed, inner phyllaries mostly 8–12+, ovate to squarish, pale, thin, membranous, becoming chartaceous, striate with translucent nerves; paleae broadly to narrowly linear, similar to inner phyllaries; ray florets mostly 5 or 8(–12), corollas yellow-orange to scarlet (often drying bluish pink to purple), the laminae broadly to narrowly ovate, 12–35 mm long, 8–15 mm wide; disc florets ca. 50–100+, corollas yellow to reddish,

narrowly cylindric, 7–12 mm long, tubes 0.5–1.5 mm long, throats 6–9 mm long, lobes 0.5–1.5 mm long; cypselae (ray florets) black to dark olive, somewhat flattened, narrowly elliptic to linear, 7–15 mm long, including apical horns 1–2 mm long, glabrous or sparsely strigose; pappi none; $2n = 32$; flowering nearly year round.

Wooded slopes, streambanks, and faces of cliffs in Tropical Rain, Lower Montane Rain, Montane Rain, Evergreen Seasonal, Pine-Oak-*Liquidambar*, and Pine-Oak forests; locally common on Gulf Coastal Plain and in Northern Highlands; 150–1900 m. Southern Mex. (Ver., Oax., Tab., Chis.), Guat., C.R., Pan.; S.A. (Col., Ecu., Peru). CHIAPAS COLLEC-

TIONS: C 85 (DS, LL); *Mc s.n.* 30 Mar 1969 (CAS); P 6794 (UC); T 8178 (TEX); 8873; 10184; 11940; 12004; 20216; 20419; 24185; 24824; 26337; 29706; 30784; 32670; 35036; 46806; 67019.

Collections of *Hidalgia ternata* from a limestone ridge in Lower Montane Rain Forest 13 km north of Berriozábal differ from others in having leaves with scarcely noticeable secondary veins (called to my attention by Dr. Smith) and larger heads with bigger rays that dry to bright yellow rather than to cyanic shades. Such plants may represent a distinct taxon.

35. IOSTEPHANE

Iostephane Benth. in G. Bentham & J. D. Hooker, Gen. pl. 2:368. 1873. — TYPE: *Iostephane heterophylla* (Cav.) Benth. ex Hemsl. \equiv *Coreopsis heterophylla* Cav.

Pionocarpus S. F. Blake, Proc. Amer. Acad. Arts 51:521. 1916. — TYPE: *Pionocarpus madrensis* (S. Watson) S. F. Blake \equiv *Helianthella madrensis* S. Watson \equiv *Iostephane madrensis* (S. Watson) Strother.

Perennials, \pm scapiform, to 15 dm high, rhizomatous from tuberiform rootstocks; leaves mostly in basal rosettes, the cauline alternate, form variable among plants, less so within plants, petioles winged, at least distally, blades membranous to coriaceous, lanceolate to broadly ovate or deltate, often each with a deep, rounded sinus on each side, then pandurate to 3-lobed, bases cuneate to subtruncate or subcordate, margins entire or subentire to coarsely dentate with callous teeth, apices obtuse to acute or acuminate, faces coarsely scabrous to nearly glabrous; heads borne singly or 2–5(–12) in very loose associations; peduncles scapiform, bracteate, often swollen and fistulose distally; involucre turbinate to hemispheric, 1–2 cm high; phyllaries 12–26 in 2(–3) series, subequal, herbaceous, lance-linear to broadly lanceolate or lance-ovate, acute to acuminate, strigoso-pilose; receptacles convex to conical; paleae scarious to cartilaginous, navicular, keeled or not, acuminate, pungent, closely strigose; ray florets 8–21, neuter or stylerous but infertile, corollas purplish to pink (sometimes white) or yellow to orange, tubes stout, laminae oblong to ovate, showy; disk florets 15–110+, bisexual, fertile, corollas yellow (sometimes with purplish lobes), tubes usually glabrous, lengths ca. 1/3 or less those of the abruptly ampliate, cylindric, sparsely pubescent throats; anthers blackish, very slender, minutely sagittate; style branches rather stout, abruptly hispidulous-penicillate; cypselae purplish black, oblong-obovate in profile, slightly compressed, typically quadrate in cross section, glabrous or strigose; pappi none or of 1–2, fragile or deciduous, setose squamellae 1–3 mm long plus 0–4(–18), erose-lacerate, free or connate squamellae 0.5–1 mm long; $x = 17$.

Four species, all Mexican (Sin., Chih., Dgo. east and south to W Ver. and central Chis.).

REFERENCE: STROTHER, J. L. 1982. *Pionocarpus* becomes *Iostephane* (Compositae: Heliantheae): A synopsis. *Madroño* 30:34–38.

1. *Iostephane trilobata* Hemsl. in F. Godman and O. Salvin, Biol. cent.-amer., Bot. 2:169. 1881.

— TYPE: Mexico, Chiapas, without locality or date, *A. B. Ghiesbreght s.n.* [101] (K; isotype: GH!).

Rudbeckia chrysantha Klatt, Leopoldina 23:143. 1887. — *Echinacea chrysantha* Schultz-Bip., in sched. fide Klatt, loc. cit. — TYPE: Mexico, "Cumbre de Estepa," *F. M. Liebmann s.n.* [575] (C; leaf and drawing: GH!).

Gymnolomia scaposa Brandegee, Univ. Calif. Publ. Bot. 4:93. 1910. — TYPE: Mexico, Puebla, near Coaxcatlan, oak forests, 8000–9000 ft. [2440–2743 m], Sep 1909, *C. A. Purpus* 4120 (UC!; isotypes: F!, GH!, MO!, NY!, US!).

ILLUSTRATION: Fig. 23.

Herbs, mostly 2–6 dm high; petioles 6–10(13–15) cm long, leaf blades 6–8(3–12) cm long, 3–4(2–6) cm wide; phyllaries 12–21, lance-linear to linear, 6–12 mm long, 1.5–3.1 mm wide; paleae 5.8–9.8 mm long; ray florets 5–9, corollas yellow to orange, laminae 9–20 mm long; disc florets 15–40, corollas 4.2–6 mm long; cypselae 3.2–4.8 mm long, glabrous; pappi none; $2n = 34$, ca. 68; flowering Jul–Nov.

Open places in Evergreen Cloud and Pine-Oak forests; scattered locally in Northern Highlands, on Central Plateau, and in W Sierra Madre; 1675–2600 m. Southern Mex. (Mex., Pue., Oax., Chis.). CHIAPAS COLLECTIONS: *G* [101] (GH); *G* [561] (GH, MO, NY); *L* 2335 (DS, ENCB, US); *EWN* 3223 (GH, US); *P* 10055 (= "55"; GH, NY, POM, UC, US); *RT* 41395 (DS); *T* 60 (DS); *T* 1516 (DS, ENCB, F, MICH, MSC); *T* 9322 (CAS, TEX); *We* 17990 (CAS); 6742; 12056; 13094; 15042; 37273; 39602; 40768; 41842; 46342; 46365.

36. JAEGERIA

Jaegeria Kunth, Nov. gen. sp., ed. fol. 4:218. 1820 [1818]; ed. qto. 4: 277. 1820. — TYPE: *Jaegeria mnioides* Kunth. = *Jaegeria hirta* (Lag.) Less.

Aganippea Sessé & Moc. ex DC., Prodr. 6:3. 1838. — TYPE: *Aganippea bellidiflora* Sessé & Moc. ex DC. = *Jaegeria bellidiflora* (Sessé & Mociño) Torres & Beaman.
Heliogenes Benth., Pl. hartw. 42. 1839 [1840]. — TYPE: *Heliogenes reglae* Benth. = *Jaegeria pedunculata* Hook. & Arn.
Macella C. Koch, Index Sem. Hort. Berol. 1855: App. 13. 1856. — TYPE: *Macella hirta* (Lag.) C. Koch [fide ING; Koch cited, “*Acmella hirta*, Lag. in Spreng. Syst. Veg. 3:591”].

Herbs, annual or perennial, to 1+ m high (one sp. comprising diminutive rosette plants); often rooting at proximal nodes; leaves opposite, sessile or petiolate, blades mostly ovate to lanceolate, 3–5-nerved from their bases, margins entire or serrate, faces glabrous or pilose to hirsute; heads borne singly or in leafy cymiform or subumbelliform associations; peduncles none or 5–40 mm long; involucre cylindro-campanulate to hemispheric or saucer-shaped, mostly 3–6 mm diam.; phyllaries 5–13(3–22) in 1(–2?) series, herbaceous, often with membranous, hyaline, conduplicate margins and each enfolding a ray ovary; receptacles convex to narrowly conic; paleae ± persistent, cartilaginous to scarious, ovate to lance-ovate or lanceolate, navicular, often ciliolate, the tips often indurate and pungent; ray florets 3–13(–22), pistillate, fertile, corollas showy to inconspicuous, yellow to orange or ochroleucous, sometimes purplish, the tubes stout or wanting, glabrous, laminae ovate to oblong, often retuse; disc florets 8–60(–100+), bisexual, fertile, corollas yellow to ochroleucous, sometimes marked with purple, tubes usually pilosulous or villous, shorter than or equal to the cylindric to campanulate throats, lobes (4–)5, deltate to linear-deltate; style branches stigmatic almost to the rounded tips; cypselae blackish, narrowly obovoid to obscurely obpyramidal or clavate, sometimes slightly obcompressed, glabrous, minutely striate; pappi none; $x = 9$.

Ten or so Neotropical or subtropical species, often in damp places or in standing water; Mexico through Central America to South America (to Uruguay) and Galapagos Islands.

REFERENCES: TORRES, A. M. 1968. Revision of *Jaegeria* (Compositae – Heliantheae). Brittonia 20:52–73; TURNER, B. L. 1980. La taxonomía del género *Aphanactis* (Asteraceae – Heliantheae). Bol. Soc. Argentina Bot. 19:33–44.

- a. Erect plants, usually more than 5 cm high; heads borne singly or in open cymiform clusters; peduncles mostly 5–15(–40) mm long; disc florets 20–60 1. *J. hirta*
- aa. Rosette plants less than 1 cm high; heads borne in sessile or subsessile clusters; peduncles less than 2 mm long; disc florets 6–12+ 2. *J. standleyi*

1. *Jaegeria hirta* (Lag.) Less., Syn. gen. Compos. 223. 1832.

— *Acmella hirta* Lag., Gen. sp. pl. 31. 1815. — TYPE: “Hab. in America. cel. Lud. Neé legit.”; NEOTYPE: (Torres 1968): Mexico, Michoacán, ca. 18 miles [29 km] S of Patzcuaro, 8900–9000 ft. [2715–2743 m], 20–25 Nov 1961, R. M. King and T. Soderstrom 5154 (US; isotypes: MICH, NY, SMU, TEX, UC!).

Jaegeria mnioides Kunth, Nov. gen. sp., ed. fol. 4:218, tab. 400. 1818 [1820]; ed. qto. 4:278. 1820. — TYPE: Mexico, Michoacán, near Aria, 1000 hex. [1800 m], Sep, A. J. A. Bonpland s.n. (P, microfiche!).

Jaegeria bellidioides Spreng., Syst. veg., ed. 16. 3:591. 1826. — TYPE: Uruguay, Montevideo, F. Sellow s.n. (B, destroyed; isotype: P).

Jaegeria parviflora DC., Prodr. 5:544. 1836. — TYPE: Brazil, “prov. Sancti-Pauli = Mus. imp. Bras. sub n. 433 miss.” (P).

Jaegeria repens DC., Prodr. 5:544. 1836. — TYPE: Brazil, Prov. Rio de Janiero, “ad Serra dos Orgaos,” Vauthier s.n. [323] (protologue) or [96] in 1833 (G-DC, microfiche!).

Spilanthes karwinskiana DC., Prodr. 5:623. 1836. — TYPE: Mexico, W. F. Karwinski s.n. (M; ?fragment: G-DC, microfiche!).

Spilanthes mariannae DC., Prodr. 5:623. 1836. — TYPE: Brazil, “prov. Minarum—Generalium ad Mariannam,” Vauthier s.n. [322] (G-DC, microfiche!).

Spilanthes eclipioides Gardner, London J. Bot. 7:407. 1848. — TYPE: Brazil, border provs. Minas Gerais and Rio de Janiero, near Perna de Pao, Oct 1840, G. Gardner 4922 (BM; isotype: K).

Spilanthes sessilifolia Hemsl. in F. Godman and O. Salvin, Biol. cent.-amer., Bot. 2:193. 1881. — TYPE: Mexico, Veracruz, Orizaba, C. Sallé 41 (K).

Jaegeria hirta (Lag.) Less. var. *glabra* Baker in C. Martius, Fl. bras. 6(3):167. 1884. — TYPE: none designated; several collections cited.

Jaegeria discoidea Klatt, Jahrb. Hamburg. Wiss. Anst. 10:126. 1893. — TYPE: Mexico, México, Sierra de las Cruces, 1 Oct 1892, C. G. Pringle 4279 (US; isotypes: MO, MSC).

ILLUSTRATION: Fig. 24.

Annuals (?sometimes persisting), ± erect, 5–20(–50+) cm high; leaves subsessile or sessile, blades rhombo-ovate to lanceolate or oblanceolate, 1–3(–6) cm long, 5–15(–40) mm wide, margins subentire to remotely serrate, ciliolate with hairs 1–2.5 mm long, abaxial faces gray green, both faces sparsely to densely hirsute; heads borne singly or in loose cymiform associations; peduncles slender, 5–15(–40) mm long, often pilosulous; involucre broadly campanulate to saucer-shaped, 3–5+ mm in diam.; phyllaries 5–8+, greenish, herbaceous, lanceolate to lance-ovate, conduplicate, margins hyaline, abaxially pilosulous; receptacles narrowly conical; paleae stramineous, scarious to hyaline-membranous, lance-ovate to lanceolate, weakly navicular, 1.5–2.5 mm long, ciliolate, apically pungent; “ray” florets 5–8+, corollas inconspicuous or showy, yellow, often drying white or ochroleucous, tubes 0.3–0.5 mm long, laminae ovate to oblong, 1–2(–5) mm long; disc florets 20–60, corollas yellow to ochroleucous, often with purplish throats, tubes 0.3–0.5 mm long, throats abruptly dilated, campanulate, 0.5–0.8 mm long, lobes narrowly deltate, 0.2–0.3 mm long;

style branches 0.3 mm long; cypselae 0.8–1.2 mm long; $2n = 36$; flowering Aug–Jan.

Mostly ruderal in Montane Rain, Evergreen Cloud, Pine-Oak-*Liquidambar*, and Pine-Oak forests; common on Central Plateau, uncommon in Northern and Eastern highlands and in SE Sierra Madre; 1170–3500 m. Mex. (Chih., Sin., Dgo., S.L.P., Nay., Jal., Hgo., Cma., Mich., Méx., D.F., Mlos., Pue., Ver., Oax., Chis.), Guat., Salv., Nic., C.R., Pan.); S.A. (Col. Ven., Ecu., Peru, Bol., Braz., Arg., Parag., Urug.). CHIAPAS COLLECTIONS: *GG* 73 (CAS, TEX); *GG* 182 (CAS, TEX); *He* 274 (CAS); *He* 1203 (TEX); *R&B* 19812 (DS); *RT* 41050 (DS); *SI* 2376 (TEX); *SI* 3107 (TEX); *SI* 3111 (TEX); *SI* 3133 (TEX); *SI* 3140 (TEX); *Sund* 2386 (TEX); *T* 407A (DS, LL); *T* 5069 (UC); *Vi* 862 (TEX, UC); *Vi* 866 (TEX, UC); *TW* 2396 (TEX); 12607; 127754; 12899; 13002; 13279; 13427; 13745; 22949; 29412; 31700; 37131; 39757; 40209; 40867; 41854; 42535; 53831; 56471.

2. *Jaegeria standleyi* (Steyerm.) B. L. Turner, Bol. Soc. Argentina Bot. 19:44. 1980.

— *Aphanactis standleyi* Steyerm., Publ. Field Mus. Nat. Hist., Bot. Ser. 22:390., fig. 3. 1940. — TYPE: Guatemala, Chimaltenango, near Santa Elena, Cerro de Tecpam, 2700 m, 4 Dec 1938, P. C. Standley 58674 (F).

ILLUSTRATION: **Fig. 25**; see also, protologue of *Aphanactis standleyi*.

Annuals, forming rosettes, mostly less than 1 cm high; leaves sessile, blades ovate to suborbicular, 5–12(–20) mm long, 3–10(–18) mm wide, margins entire or serrate, hirsute, abaxial faces hirsute, adaxial faces paler, grayish, less hairy; heads 3–4(2–5+) in terminal sessile or subsessile, subumbelliform clusters, peduncles less than 2 mm long; involucre cylindro-campanulate, 1.5–3 mm in diam.; phyllaries 3–5, green, herbaceous, lance-ovate to lanceolate, conduplicate, abaxially hirsutulous; receptacles convex; paleae stramineous, the outer cartilaginous and ovate, the inner more scarious and lanceolate, navicular, all 1.5–2.5 mm long, acute, glabrous but for distally ciliolate margins; “ray” florets 3–5, corollas inconspicuous, yellow to whitish, glabrous, tubes 0.2–0.3 mm long, laminae narrowly ovate, 0.4–0.6 mm long; disc florets 6–12+, corollas ochroleucous to yellowish, tubes 0.2–0.3 mm long, proximally pilosulous, throats campanulate, 0.3–0.5 mm long, lobes narrowly deltate, 0.2–0.3 mm long; style branches ca. 0.2 mm long; cypselae 1–1.3 mm long; flowering Nov.

Wet meadow, southeast summit of Volcán Tacaná, SE Sierra Madre; 3600 m. Southern Mex. (Chis.), Guat. CHIAPAS COLLECTION: 29348.

37. LAGASCEA

Lagascea [Lagasca] Cav., Anales Cien. Nat. 6:331. 1803, corr. Willd., Enum. 941. 1809. nom. conserv. — TYPE: *Lagascea* [Lagasca] *mollis* Cav.

Nocca Cav., Icon. 3:12, t. 224. 1795. [*Noccea* of Willd., Sp. pl. 3: 2393. 1803, non Moench 1802.], nom. rejic. — TYPE: *Nocca rigida* Cav. = *Lagascea rigida* (Cav.) Stuessy.

Calhounia A. Nelson, Univ. Wyoming Publ. Sci., Bot. 1:55. 1924. — TYPE: *Calhounia nelsoniae* A. Nelson = *Lagascea decipiens* Hemsl. (fide Stuessy 1978).

Annuals, perennial herbs, or shrubs, to 2(–3) m high; leaves opposite, petiolate or sessile, blades mostly lanceolate to ovate or oblanceolate, triplinerved at or above their bases, margins typically serrate, abaxial faces subglabrous to pilose, sericeous, or tomentose, adaxial faces subglabrous to strigose or scabrous, sometimes vernicose; heads proper discoid, usually bearing 1 floret (rarely 2–8), sessile or nearly so, 8–55 heads usually secondarily aggregated into campanulate to globose clusters, the clusters subtended by 4–6+ leaflike or phyllary-like bracts, pedunculate, borne singly or cymiform- or racemiform-congested at ends of branches; involucre of true heads campanulate to tubular-cylindric, 4–15 mm high; phyllaries 4–6(–11), subequal, connate ca. 5/6 their lengths, commonly pilose, sometimes stipitate-glandular as well, each bearing 1–3 rows of 1–8 translucent resin glands; receptacles convex; paleae rarely present; florets bisexual, fertile, corollas yellow, tubes slightly shorter than the ampliate, cylindric to campanulate throats, lobes 5, rounded-deltate to lance-triangular, throats and lobes commonly hirtellous to pilose; style branches generally much exerted, markedly hirtellous; cypselae black to brown, mostly obovoid to cylindric, sometimes somewhat flattened, often basally attenuate, minutely striate, glabrous or hirtellous to subpilose, at least distally; pappi minute coronas or of unequal, pubescent awns; $x = 17$.

Eight species; all American, centered in southern Mexico; one adventive, now widely scattered near coasts throughout tropics and subtropics.

REFERENCE: STUESSY, T. F. 1978. Revision of *Lagascea* (Compositae, Heliantheae). Fieldiana, Bot. 38:75–133.

- a. Coarse perennial herbs or suffrutices; leaves sessile, blades 8–15(–30) cm long; corollas 10–16+ mm long 1. *L. helianthifolia*
- aa. Annuals (rarely persisting); leaves petiolate, blades 2–7+ cm long; corollas 3.5–7 mm long 2. *L. mollis*

1. *Lagascea helianthifolia* Kunth, Nov. gen. sp., ed. fol. 4:19. 1820 [1818]; ed. qto. 4:25. 1820.

— *Noccaea helianthifolia* (Kunth) Cass. in F. Cuvier, Dict. sci. nat., ed. 2. 25:104. 1822. — *Calhounia helianthifolia* (Kunth) A. Nelson, Univ. Wyoming Publ. Sci., Bot. 1:58. 1924. — TYPE: Mexico, Guerrero, near Acapulco, Apr 1803, *A. von Humboldt and A. J. A. Bonpland s.n.* (P, microfiche!).

All Chiapas collections of this species are referable to:

1a. *Lagascea helianthifolia* Kunth var. *helianthifolia*.

Lagascea suaveolens Kunth, Nov. gen. sp., ed. fol. 4:20. 1820 [1818]; ed. qto. 4:25. 1820. — *Noccaea suaveolens* (Kunth) Cass. in F. Cuvier, Dict. sci. nat., ed. 2. 25:105. 1822. — *Nocca helianthifolia* (Kunth) Cass. var. *suaveolens* (Kunth) B. L. Rob., Proc. Amer. Acad. Arts 36:468. 1901. — *Lagascea helianthifolia* Kunth var. *suaveolens* (Kunth) B. L. Rob., Proc. Amer. Acad. Arts 43:38. 1907. — *Calhounia suaveolens* (Kunth) A. Nelson, Univ. Wyoming Publ. Sci., Bot. 1:59. 1924. — TYPE: Mexico, Guerrero, "Crescit in declivite occidentali montium Mexicanorum inter fluvium Papagallo et Venta Colorada, alt. 90–200 hex. [162–360 m]," Apr 1803, *A. von Humboldt and A. J. A. Bonpland* 3899 (P, microfiche!).

Nocca latifolia Cerv. in P. La Llave and J. M. Lexarza, Nov. veg. descr. 1:31. 1824. — *Lagascea latifolia* (Cerv.) DC., Prodr. 5:92. 1836. — TYPE: not located (cf. Stuessy 1978).

Lagascea tomentosa B. L. Rob. & Greenm., Proc. Amer. Acad. Arts 32:43. 1896. — *Nocca tomentosa* (B. L. Rob. & Greenm.) B. L. Rob. & Greenm., Proc. Amer. Acad. Arts 36:470. 1901. — *Calhounia tomentosa* (B. L. Rob. & Greenm.) A. Nelson, Univ. Wyoming Publ. Sci., Bot. 1:59. 1924. — TYPE: Mexico, Guerrero, between Ayusina and Petatlán, 5000–7800 ft. [1524–2379 m], 14 Dec 1894, *E. W. Nelson* 2121 (GH; isotype: US).

Lagascea helianthifolia Kunth var. *adenocaulis* B. L. Rob., Proc. Amer. Acad. Arts 43:38. 1907. — TYPE: Mexico, Michoacán, Uruapan, 24 Jan 1907, *C. G. Pringle* 13907 (GH; isotypes: CAS!, F, MICH, MO, MSC, SMU, TEX, UC!, US).

Nocca pteropoda S. F. Blake, Contr. U.S. Natl. Herb. 22:597. 1924. — *Lagascea pteropoda* (S. F. Blake) Standl., Publ. Field Columbian Mus., Bot. Ser. 8:398. 1931. — TYPE: Mexico, Oaxaca, district of Cuicatlan, Cuamecala, 14 Apr 1919, *C. Conzatti and I. C. Gomez* 3470 (US; isotype: MEXU).

ILLUSTRATION: Fig. 26.

Coarse, perennial herbs or suffrutes, to 2(–3) m high; leaves mostly sessile (or petioles broadly winged?), blades lance-elliptic to narrowly and subtly obpandurate, often with first strong lateral veins arising 1/4–1/3 above their bases, 8–15(–30) cm long, 5–8(–12) cm wide, bases subcordate to auriculate (winged petioles?), margins coarsely serrate, apices acute, abaxial faces softly pilose to subtomentose, adaxial faces glabrous or scabrous; "peduncles" 1–15 mm long; floral clusters each of 20–30

heads, the clusters roughly campanulate, mostly 2–3 cm high, usually in cymiform aggregations at ends of branches, each cluster subtended by 4–7, lance-linear to lanceolate bracts 2–3 cm long, the bracts longitudinally nerved, sparsely shaggily pilose and densely hirsutulous, often stipitate-glandular as well; true heads bearing a single floret each; phyllaries 5(–6), mostly 7–9 mm long, connate nearly to the rounded or acute apices, one usually longer than the others, all shaggily pilose to villous and each bearing 1–5 oblong glands medially; corollas whitish, often blackish at bases of throats and sometimes reddish distally, tubes 4–6 mm long, throats abruptly dilated, cylindric, 5–7+ mm long, pilose distally or throughout, lobes rounded-deltate, ca. 1.5(–3) mm long, abaxially pilose; style branches hispidulous, ca. 5 mm long; cypselae black, flattened, obovate to roughly cuneate in outline, 5–8 mm long, glabrous or pilose, at least distally; pappi minute, pubescent coronas; $2n = 34$; flowering Aug–Feb.

Grassy or wooded slopes, walls of canyons, and along ravines in Seasonal Evergreen, Tropical Deciduous, Pine-Oak-Liquidambar, and Pine-Oak forests; common on Central Plateau, uncommon in Northern Highlands, Central Depression, and Sierra Madre; 670–1850 m. Mex. (Tam., S.L.P., Mich., Mex., Pue., Ver., Gro., Oax., Chis.), Guat., Hond., Salv., Nic. CHIAS COLLECTIONS: *Br* 655 (TEX) *Co* 5013 (CAS, TEX); *Cro* 64929 (TEX); *L* 405 (DS); *L* 568 (DS); *L* 916 (DS, LL); *L* 2571 (DS); *L* 2973 (DS); *Lo* 364 (TEX); *EM* 791 (LL); *EM* 1961 (TEX); *Prat* 1093 (CAS, TEX); *SC* 296 (CAS); *SI* 2154 (TEX); *Spe* 6941 (CAS); *Sund* 2409 (TEX); *T* 1510 (DS); *T* 1791 (DS, LL); *T* 3352 (DS, LL); *TW* 2376 (CAS, LL, TEX); *Z* 766 (DS); 7240; 7577; 9011; 13779; 14057; 23079; 23387; 23906; 42483; 46689; 48017; 56889.

2. *Lagascea mollis* Cav., Anales Cien. Nat. 6:332, t. 44. 1803.

— *Nocca mollis* (Cav.) Jacq., Fragm. bot. 58, t. 85. 1806. — LECTOTYPE (Stuessy 1978): Grown in Madrid from Cuban seed, *M. Espinosa and J. N. Peralta s.n.* (MA; isotype: F).

For additional synonymy see Stuessy (1978).

ILLUSTRATION: none found.

Annuals (rarely persisting), to 1 m high; petioles slender, mostly 10–25 mm long, leaf blades lanceolate to ovate, triplinerved from near their bases, mostly 2–7 cm long, 1–4 cm wide, bases obtuse to cuneate, margins subentire to serrate, apices acute, both faces finely scabrellous; "peduncles" terminal, mostly 3–5(–14) cm long; floral clusters each of 8–25 heads, broadly campanulate, becoming globose, ca. 1 cm high, each subtended by 4–5 unequal, lanceolate to obovate bracts 5–15 mm long, the bracts strigose and often sparsely stipitate-glandular; true heads bearing a single floret each; phyllaries 4–5, mostly 4–5 mm long, connate but for distal 1.5 mm, all sparsely to densely pilose to villous, each bearing 2–3 rows of 5–8 glands; corollas white to rosaceous, tubes 1–2 mm long, throats dilated, 1.5–3 mm long, lobes lance-triangular, 1–2 mm long, abaxially hirtellous; style branches hirsutulous, ca. 1.5 mm long; cypselae black, flattened, obovoid, ca. 3 mm long, wholly glabrous or abaxially pilose; pappi minute, pubescent coronas; $2n = 34$; flowering Nov.

Disturbed roadsides in "Acacia coastal savannah" and Tropical Deciduous Forest; rare in Central Depression; 550 m. South-

ern Mex. (Jal., Cma., Mich., Ver., Camp., Yuc., Q. Roo, Chis.),
Guat., Bel., Hond., Nic.; Antill.; S.A. (Col., Ven., Ecu., Per.,

Bol., Braz., Arg.); adventive in Fla., Africa, India, and Java.
CHIAPAS COLLECTIONS: *LeD* 2188 (DS, LL); 47147.

38. LASIANTHAEA

Lasianthaea DC., Prodr. 5:607. 1836. — TYPE: *Lasianthaea helianthoides* DC.

Mostly shrubs, some trees and tuberous-rooted perennial herbs, to 7 m high; leaves opposite, petioles often ciliate, blades mostly broadly ovate to lanceolate, usually 3-nerved, often serrate, not lobed; capitulescences usually umbelliform to corymbiform clusters of 3–25+ heads; peduncles stout to slender, ebracteate; involucre obconic to hemispheric or cylindric, mostly 5–15 mm high; phyllaries mostly 12–20 in 2–5 series, subequal to strongly unequal and imbricate, often basally indurate, commonly strigillose and ciliolate; receptacles slightly convex; paleae chartaceous to indurate, navicular, minutely keeled, blunt to acute, often erose distally; ray florets 5–21(–30), pistillate, fertile, corollas yellow to reddish orange or purplish, tubes slender, often puberulent distally, laminae narrowly oblong to elliptic; disc florets 20–50(8–200), bisexual, fertile, corollas concolorous with rays, tubes slender, about half as long as the slightly ampliate, cylindric throats, lobes 5, deltate, adaxially papillate, abaxially glabrous or hispidulous; style branches very slender with subulate, hispidulous appendages; cypselae mostly dark with paler margins, mostly triquetrous (ray) or flattened (disc), cuneate in outline, glabrous, margins (at least the adaxial) sharply drawn, winglike, each continuous with a subtended awn; pappi of 2(–3), stout to slender awns plus 0–4+, free or connate, shorter squamellae; $\tau = 10$ or 11.

A dozen or so species, all American, ranging from southern Arizona to Panama and northern South America (Venezuela); centered in southwestern Mexico; allied with *Damnicanthodium*, *Lundellianthus*, and other Ecliptinae.

REFERENCE: BECKER, K. M. 1979. A monograph of the genus *Lasianthaea* (Asteraceae). Mem. New York Bot. Gard. 31(2):1–64.

- a. Involucres 7–12 mm high; phyllaries ca. 8–12 in 2–3 series, subequal; ray corolla laminae mostly 9–15 mm long 2. *L. fruticosa*
- aa. Involucres mostly 5–8 mm high; phyllaries ca. 12–15 in 3–5 series, strongly unequal; ray corolla laminae 5–7(–9) mm long 1. *L. ceanothifolia*

1. *Lasianthaea ceanothifolia* (Willd.) K. M. Becker, Mem. New York Bot. Gard. 31(2):38. 1979.

— *Verbesina ceanothifolia* Willd., Sp. pl. 3:2225. 1804.
— *Zexmenia ceanothifolia* (Willd.) Schultz-Bip. in B. C. Seemann, Bot. voy. *Herald* 305. 1856. — TYPE: Mexico, Guerrero, Acapulco, A. von Humboldt and A. J. A. Bonpland s.n. (B, herb. Willd. 16390, microfiche!).

All Chiapas collections of this species are referable to:

1a. *Lasianthaea ceanothifolia* (Willd.) K. Becker var. *ceanothifolia*

Lipochaeta umbellata DC., Prodr. 5:610. 1836. — TYPE: Mexico, Morelos, near Cuernavaca, 20 Aug 1827, J. L. Berlandier 1065 (G-DC, microfiche!; isotypes: GH, P, W).
Lipochaeta umbellata DC. var. *conferta* DC., Prodr. 5:610. 1836. — *Zexmenia ceanothifolia* (Willd.) Schultz-Bip. var. *conferta* (DC.) A. Gray ex W. W. Jones, Proc. Amer. Acad. Arts 41:155. 1905. — TYPE: Mexico, Morelos, Cuernavaca, 20 Aug 1827, J. L. Berlandier 1053 (G-DC, microfiche!; isotypes: BM, G, GH, NY, P, W).

ILLUSTRATION: none found.

Shrubs or suffrutescent, 1–3(–6) m high; petioles mostly 2–12 mm long, usually ciliolate, leaf blades mostly ovate to rounded-

rhombic or lanceolate, 3–7(–12) cm long, 2–4+ cm wide, bases rounded to cuneate, margins serrate, apices acute to weakly attenuate, both faces strigose-hispid or the abaxial more pilose; heads (2–)6–25+ in compact umbelliform to corymbiform clusters at ends of branches; peduncles stout to very slender, often hispid, mostly 1–2 cm long; involucre campanulate to cylindric, mostly 5–8 mm high; phyllaries ca. 12–15+ in 3–5 series, strongly imbricate, the outer shortest, ovate to suborbicular, the inner longer, ovate to oblong, all closely and finely strigillose, marginally and distally ciliolate; paleae stramineous, stiff, navicular, minutely keeled, distally erose, 6–7 mm long; ray florets mostly 5–8(–13), corollas yellow, tubes ca. 2 mm long, laminae narrowly oblong, 5–7(–9) mm long; disc florets mostly 10–40, corollas yellow, 5–7 mm long, tubes ca. 2 mm long, throats ca. 4 mm long, lobes adaxially papillate, ca. 0.5 mm long; cypselae ca. 4 mm long; pappi of 2–3, stramineous, stout to slender awns to 4 mm long, often with interposed, much shorter, sometimes connate, squamellae; $2n = 20, 24$; flowering Aug–Oct.

Open, disturbed places in Tropical Deciduous and Pine-Oak forests and Thorn Woodland; rare in Central Depression and on adjacent Central Highlands and in E Sierra Madre. Southern Mex. (Zac., Jal., Aguas., Gto., Mich., Mex., Mlos., Ver., Gro., Oax., Chis.). CHIAPAS COLLECTIONS: *EM* 1559 (MEXU, MICH, MO, US); *EM* 1663 (ARIZ); 46520; 46768.

2. *Lasianthaea fruticosa* (L.) K. M. Becker,
Mem. New York Bot. Gard. 31(2):13.
1979.

— *Bidens fruticosa* L., Sp. pl. 833. 1753. — *Verbesina fruticosa* (L.) L., Sp. pl., ed. 2. 1271. 1763. — *Narvalina fruticosa* (L.) Urban, Symbol. antill. 5:265. 1907. — TYPE: Origin unknown; grown in England; sent to Linnaeus; described in Hort. Cliff. (BM).

All Chiapas collections of this species are referable to:

2a. *Lasianthaea fruticosa* (L.) K. M. Becker
var. *fruticosa*.

Bidens frutescens Mill., Gard. Dict., ed 8. No. 4. 1768. — *Zexmenia frutescens* (Mill.) S. F. Blake, Contr. Gray Herb. 52:50. 1917. — TYPE: Grown in England from Costa Rican seed; herb. Sloane 316.75, fide Becker (BM).

Lipochaeta monocephala DC., Prodr. 5:610. 1836. — *Zexmenia monocephala* (DC.) Schultz-Bip. in B. C. Seemann, Bot. voy. Herald 306. 1856. — TYPE: Origin unknown; grown in Paris. (Specimen at G fide Becker)

Zexmenia costaricensis Benth., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 4:95. 1853. — *Zexmenia nicaraguaensis* Benth. ex Müll. Berol., Ann. Bot. Syst. 5:226. 1858, sphalm. — TYPE: Costa Rica, "in Monte Aguacate," Nov 1846, A. S. Oersted 8516 (K; isotypes: C, GH, US).

Zexmenia villosa Pol., Linnaea 41:579. 1877. — *Zexmenia costaricensis* Benth. var. *villosa* (Pol.) S. F. Blake, J. Bot. 53:14. 1915. — *Zexmenia frutescens* (Mill.) S. F. Blake var. *villosa* (Pol.) S. F. Blake, Contr. Gray Herb. 52:51. 1917. — *Lasianthaea fruticosa* (L.) K. M. Becker var. *villosa* (Pol.) B. L. Turner, Phytologia 69:372. 1990. — TYPE: Costa Rica, San José, San José, H. Polakowsky 466 (W; isotype: BM).

Zexmenia elegans Schultz-Bip. ex W. W. Jones, Proc. Amer. Acad. Arts 41:157. 1905. — TYPE: Mexico, Veracruz, Mirador, Nov 1841, F. M. Liebmans s.n. [378] (GH; isotypes: C).

Zexmenia elegans Schultz-Bip. ex W. W. Jones var. *kellermanii* Greenm., Publ. Field Columbian Mus., Bot. Ser. 2:348. 1912. — LECTOTYPE (Becker 1979): Guatemala, Izabal, Los Amates, 15 Feb 1908, W. A. Kellerman 7612 (F; isotypes: NY, US).

Zexmenia purpusii Brandegee, Univ. Calif. Publ. Bot. 6:75. 1914. — TYPE: Mexico, Chiapas, Cerro del Boquerón, Sep 1913, Purpus 6660 (UC!).

Zexmenia macropoda S. F. Blake, Contr. U.S. Natl. Herb. 22:634. 1924. — TYPE: Guatemala, Solola, 25 Jan 1915, E. W. D. Holway 109 (GH).

ILLUSTRATION: Fig. 27.

Shrubs or trees, mostly 2–3(–7) m high; petioles 2–30 mm long, often setose-ciliate, leaf blades lanceolate to broadly lance-ovate, mostly 8–15(–20) cm long, 2–7(–12+) cm wide, bases cuneate to rounded, margins prominently to finely serrate, apices acute to attenuate or acuminate, both faces commonly scabrous to scabrellous, the abaxial sometimes subglabrescent to hirtellous; heads (2–)5–12+ in umbelliform or corymbiform clusters; peduncles 1–4(–7+) cm long, commonly villous; involucre campanulate to subhemispheric, 7–12 mm high; phyllaries ca. 8–12 in 2–3-series, subequal, lance-ovate to ovate, finely strigillose and ciliolate; paleae stramineous, stiff, navicular, minutely keeled, 6–8 mm long; ray florets mostly 8–13, corollas bright yellow, tubes 2–3 mm long, laminae narrowly to broadly oblong, mostly 9–15 mm long; disc florets mostly 30–50+, corollas yellow, 7–8 mm long, tubes ca. 2.5 mm long, throats ca. 4.5 mm long, lobes adaxially papillate, ca. 1 mm long; cypselae 3–4 mm long; pappi of 2–3, stramineous, stout to slender awns to 3(–5) mm long, sometimes with minute squamellae between the awns; $2n = 22$; flowering mostly Sep–Dec.

Thickets and disturbed places such as along roads and at forest margins in Lower Montane Rain, Montane Rain, Evergreen Cloud, Evergreen Seasonal, Tropical Deciduous, Pine-Oak-Liquidambar, and Pine-Oak forests; common in Northern Highlands, on Central Plateau, in Central Depression and Sierra Madre, and on Pacific Coastal Plain; uncommon on Gulf Coastal Plain and in Eastern Highlands; (60–)700–2600 m. Southern Mex. (Ver., Oax., Camp., Yuc., Chis.), Guat., Bel., Hond., Nic., Pan.; northern S.A. (Ven.). CHIAPAS COLLECTIONS: Beck 39 (TEX); Beck 40 (TEX); Calz 3580 (TEX); Calz 3701 (TEX); Cro 64961 (CAS, LL); Crq 9679 (TEX); Crq 10458 (DS, TEX); Crq 10494 (DS, TEX); GV 10 (CAS); H&F 4176 (TEX); L 2148 (DS); L 2613 (DS, LL); EM 4200 (LL); EM 6181 (CAS); Neff 93-4-23-5 (TEX); Neff 93-4-25-1 (TEX); Och 4308 (CAS); Prat 1098b (TEX); P 6660 (UC); P 6677 (UC); SC 308 (CAS, TEX); Sin 2085 (TEX); SI 2086 (TEX); SI 2950 (TEX); T 294 (DS); T 1141 (DS, LL); T 1392 (DS); T 1545 (DS); T 1566 (DS); T 1591 (DS, LL); T 3298 (DS, LL); T 3780 (DS); T 4303 (CAS); T 4501 (ARIZ); T 4601 (ARIZ); T 4690 (CAS); T 9242 (TEX); Vi 800 (TEX); TW 2361 (LL); We 17814 (UC); 7419; 7593; 7762; 13806; 14127; 16130; 19862; 20495; 20503; 20546; 21899; 22165; 26464; 28275; 28433; 30925; 31671; 33429; 36715; 38132; 38441; 38606; 39727; 39882; 40086; 41183; 41464; 41520; 41662; 41898; 42754; 44361; 44449; 46021; 46159; 46398; 46534; 46665; 47264; 47718; 47979; 48024; 48372; 49005; 52705; 64896; 70127; 70651.

39. LOXOTHYSANUS

Loxothysanus B. L. Rob., Proc. Amer. Acad. Arts 43:43. 1907. — LECTOTYPE: (Rydberg, 1914, p. 32): *Loxothysanus sinuatus* (Less.) B. L. Rob. = *Bahia sinuata* Less.

Shrubs or suffrutescent; leaves mostly opposite, petiolate, blades mostly deltate to ovate or subcordate, sometimes 3-lobed, margins entire or sinuately incised to round-toothed, faces densely pubescent with short, crisped hairs to tomentose-canescens, especially the abaxial; heads (1–)3–12 in axillary or terminal corymbiform associations; peduncles very slender; involucre

broadly turbinate to hemispheric, 4–7 mm high; phyllaries (7–)10–12 in 2 series, oblanceolate, closely crisped-hairy and glandular-puberulent; receptacles slightly convex, minutely foveolate; paleae none; ray florets none; disc florets ca. 30–60+, corollas white to pinkish, glandular-puberulent, tubes slender, nearly twice as long as the campanulate throats, lobes 5, equal, lance-ovate; style branches truncate, papillate; cypselae blackish, clavate or weakly 4–5-angled, sparsely hirtellous; pappi of (5–)10–12, lance-linear, erose squamellae, the adaxial (relative to head axis) longer than the abaxial; $x = 15$.

Monotypic.

REFERENCES: RYDBERG, P. A. 1914. *Loxothysanus*. In N. L. Britton et al., N. Amer. fl. 43:32–33; TURNER, B. L. 1974. Taxonomy of *Loxothysanus* (Compositae, Heliantheae). *Wrightia* 5:45–50.

1. *Loxothysanus sinuatus* (Less.) B. L. Rob., Proc. Amer. Acad. Arts 43:43. 1907.

— *Bahia sinuata* Less., Linnaea 5:160. 1830. — TYPE: Mexico, Veracruz, "Hacienda de la Laguna," Sep 182x, C. J. W. Schiede s.n. (HAL).

Bahia nepetaefolia A. Gray, Proc. Amer. Acad. Arts 5:184. 1861. — TYPE: Mexico, Tamaulipas, Wartenberg, 1858–1859, L. C. Ervendberg 65 (GH).

Loxothysanus filipes B. L. Rob., Proc. Amer. Acad. Arts 43:44. 1907. — TYPE: Mexico, Veracruz, Zacuapan, May 1906, C. A. Purpus 1862 (GH; isotype: UC!)

Loxothysanus pedunculatus Rydb. in N. L. Britton et al., N. Amer. fl. 34:33. 1914. — TYPE: Mexico, San Luis Potosí,

Tamasopo Canyon, 24 Jun 1890, C. G. Pringle 3096 (NY; isotype: UC!).

ILLUSTRATION: none found.

Mostly to 1 m high; petioles 1–6 cm long, leaf blades 2–8 cm long; peduncles 15–35(–80) mm long, minutely bracteolate; corollas ca. 3 mm long; cypselae ca. 3 mm long; pappus squamellae to 2.5 mm long; $n = 15$.

Cliffs and sandstone bluffs in Montane Rain, Evergreen Seasonal, and Tropical Deciduous forests; rare or uncommon in southern Northern Highlands and in adjacent Central Depression; 560–1200 m. Eastern and southern Mex. (Tam., S.L.P., Hgo., Pue., Ver., Oax., Chis.). CHIAPAS COLLECTIONS: *Da* 30065 (CAS); *Sund* 2472 (TEX); 23877; 24179; 33822; 42877; 50551.

40. LUNDELLIANTHUS

Lundellianthus H. Rob., *Wrightia* 6:41, pl. 81. 1978. — TYPE: *Lundellianthus petenensis* H. Rob. = *Zexmenia guatemalensis* Donn.Sm. = *Lundellianthus guatemalensis* (Donn.Sm.) Strother.

Shrubs, to 3 m high; young stems \pm 4–6-angled, often reddish to purplish beneath indument; leaves opposite, petioles winged or not, blades lanceolate to ovate or elliptic, mostly 5–12+ cm long, triplinerved distal to their bases, bases cuneate to rounded, margins minutely revolute, serrate to denticulate, the teeth callous-tipped, apices acute to attenuate, faces scabrelous to strigillose or hispidulous; heads 1–3(–5) in umbelliform clusters at ends of branches and in distal axils, rarely, if ever, held beyond subtending foliage; peduncles slender to clavate-dilated, 1–2(–5) cm long, variously hairy; involucre campanulate at anthesis, mostly 10–15+ cm high, becoming hemispheric in fruit; phyllaries dimorphic, the outer 5–8, herbaceous, at least distally, oblong to spatulate, longer and broader than the 8–13, more membranous to chartaceous, ovate inner ones; receptacles slightly convex; paleae stramineous to reddish or purplish, navicular, keeled, basally indurate to chartaceous, connate and usually adnate to base of subtended ovary, distally more membranous, then again indurate, sharply acuminate or obscurely 3-lobed, pungent at tip; ray florets mostly 8–13, pistillate, fertile, corollas pale yellow, tubes narrowly cylindric, laminae oblong to elliptic, well-developed, showy, usually hispidulous abaxially on the nerves; disc florets 20–80+, bisexual, fertile, corollas yellow, often darker than rays, tubes narrowly cylindric, shorter than the narrowly funnelliform throats, lobes 5, deltate, abaxially scabrelous; anthers blackish or brownish with blackish or stramineous appendages; style branches, slender, attenuate and hispidulous beyond the 2 stigmatic lines; cypselae dark brown to blackish beneath stramineous to reddish brown, corky or spongy, ultimately warty tissue on faces and extending into wings on the angles, the bodies cuneate in outline, \pm contracted proximal to pappus but not rostrate, often coarsely 1–3-nerved on faces, those of ray triquetrous in cross section and winged on the angles, those of the disc flattened-quadrate, winged or not; pappi of 2–3 stout, conduplicate-based awns, the awns not confluent with margins of cypselae, 1 over each of the angles, plus 0–4 shorter, intercalated, erose, free or \pm connate squamellae; $x = 16$.

Eight species in southern Mexico and Central America; most species were originally named in *Zexmenia* La Llave, which now includes only two species.

REFERENCE: STROTHER, J. L. 1989. Expansion of *Lundellianthus* (Compositae: Heliantheae). *Syst. Bot.* 14:544–548.

- a. Peduncles dilated beneath the heads, 2–4+ mm diam. in fruit, densely and retrosely hirsute 3. *L. salvinii*
- aa. Peduncles not dilated, ca. 1 mm diam., hairs antorse.
 - b. Petioles winged, connate perfoliate; disc cypselae epappose or bearing a single, slender awn 2. *L. guatemalensis*
 - bb. Petioles not winged; disc cypselae bearing 2 stout awns plus 0–4 intercalated squamellae . . . 1. *L. breedlovei*

1. *Lundellianthus breedlovei* (B. L. Turner) Strother, Syst. Bot. 14:547. 1989.

— *Lasianthaea breedlovei* B. L. Turner, Phytologia 65:364. 1988. — TYPE: Mexico, Chiapas, 10 km south-west of Ocosingo on road to San Cristóbal de Las Casas, 1200 m, 23 Sep 1972, D. E. Breedlove 27848 (TEX!; isotypes: DS!, MICH!, MO!).

ILLUSTRATION: Phytologia 65:370. 1988.

Shrubs, to 2 m high; young stems usually 6-angled, rusty red to puce with white, appressed hairs to ca. 0.4 mm long; petioles 3–10 mm long, not winged, leaf blades lanceolate to lance-elliptic, mostly 5–13 cm long, 15–50 mm wide, bases cuneate, margins obscurely to prominently serrate or denticulate, apices acute to attenuate, abaxial faces subglabrous to scabrellous with white, appressed to ascending hairs 0.1–0.4 mm long, adaxial faces subglabrous to hispidulous with longer, more erect hairs; heads 1–3(–5) in umbelliform clusters at ends of branches and in axils; peduncles slender, 5–15(–45) mm long, ca. 1 mm diam., hirsutulous with patent or antrorse hairs; involucre narrowly campanulate to hemispheric; outer phyllaries 5–8, herbaceous, lanceolate to oblong or spatulate, 7–15+ mm long, scabrellous to hirsutulous, the inner 8(–13), more chartaceous to indurate, ovate, 4–7+ mm long; receptacles slightly convex; paleae stramineous to reddish brown, 6–8 mm long; ray florets 8–13, corollas pale yellow, tubes 2.5–3 mm long, laminae oblong to broadly elliptic, 7–12 mm long; disc florets 20–80, corollas pale yellow, tubes 1.5–2 mm long, throats 3–4.5 mm long, lobes 0.5–0.8 mm long; anther appendages blackish; style branches ca. 2 mm long; cypselas bodies covered with reddish brown, sometimes stramineous, corky tissue, cuneate to oblanceolate in outline, triquetrous (ray) or rhombic-quadrate (disc) in cross section, 3–4 mm long, sharply nerved or narrowly winged on the angles, often with 1–2 strong nerves on faces as well, wings becoming chartaceous or corky, extending onto pappus awns, wings and faces sometimes becoming warty with corky tissue; pappi of 2 awns mostly 1–3.5 mm long plus 0–4 squamellae 0.3–1.5 mm long; flowering Aug–Jan.

Chiapas endemic: Lower Montane Rain, Montane Rain, Evergreen Seasonal, Pine-Oak-Liquidambar, and Pine-Oak forests; uncommon in Eastern Highlands; 750–1500 m. CHIAPAS COLLECTIONS: 27848; 37059; 49701; 52254; 55010; 56426; 57701.

2. *Lundellianthus guatemalensis* (Donn. Sm.) Strother, Syst. Bot. 14:544. 1989.

— *Zexmenia guatemalensis* Donn.Sm., Bot. Gaz. 13:188. 1888. — *Lasianthaea guatemalensis* (Donn.Sm.) B. L. Turner, Phytologia 65:366. 1988. — TYPE: Guatemala, Alta Verapaz, Cobán, 4300 ft. [1312 m], Feb 1886, H. von Tuerckheim s.n. [853] (US!; isotypes: GH!, FI!, MICH!, NY!).

Lundellianthus petenensis H. Rob., Wrightia 6:41, pl. 81. 1978. — TYPE: Guatemala, Petén, Lake Petén Itza, between San José and Chachaclun, 22 Jan 1971, E. Contreras 10365 (US!; isotype: UTD).

ILLUSTRATION: Wrightia 6:pl. 81. 1978.

Shrubs, to 2 m high; young stems 6-angled or -striate, antrorsely strigillose with appressed hairs to ca. 0.4 mm long;

petioles 5–12(–40) mm long, narrowly winged, connate-perfoliate, leaf blades lanceolate to lance-ovate, 5–12(–18+) cm long, 1–4(–7) cm wide, bases narrowly cuneate to rounded, margins serrate, apices attenuate, abaxial faces closely pubescent with white, ± erect, rarely appressed, hairs 0.2–0.4 mm long, adaxial faces scabrellous to hispidulous with hairs to 1 mm long; heads 1–3(–5) in umbelliform clusters in distal axils and at ends of branches; peduncles 1–3(–5) cm long, slender, mostly less than 1 mm diam., pilosulus with patent or antrorse hairs; involucre campanulate to hemispheric; outer phyllaries 5–8, herbaceous, oblong to spatulate or lance-linear, 9–14 mm long, acute to acuminate, strigillose to scabrellous, the inner 8–13, membranous to chartaceous, oblong to ovate, obtuse to acute, nearly glabrous; paleae stramineous, 7–9 mm long; ray florets 8, corollas pale yellow, tubes 1.5–3 mm long, laminae oblong-elliptic, 12–18+ mm long; disc florets 20–60+, corollas pale yellow, tubes 2–3 mm long, throats 3–4 mm long, lobes 1–1.2 mm long; anther appendages blackish; style branches 2.5 mm long; cypselas 2.5–3.5 mm long, those of the rays winged on the angles, the wings chartaceous, extending onto the pappus awns, those of the disc not winged; pappi of ray cypselas of 1–3 stout, triquetrous-based awns 1–2 mm long, usually connate with intercalated squamellae 0.5–1+ mm long, pappi of disc cypselas none or each a single, slender awn to 4 mm long; flowering Feb–Mar.

Wooded slopes and ridges and along streams in Lower Montane Rain, Montane Rain, Pine-Oak-Liquidambar, and Pine-Oak forests; uncommon in Eastern Highlands; 300–1700 m. Southern Mexico (Chis.), Guat., Bel. CHIAPAS COLLECTIONS: Cro 46532 (MO); PM 167 (CAS, TEX); T 3510 (DS, MICH); T 3648 (DS); T 9600 (CAS); T 9614 (CAS); 49383; 49948; 49982; 50443; 57139; 58459.

3. *Lundellianthus salvinii* (Hemsl.) Strother, Syst. Bot. 14:545. 1989.

— *Zexmenia salvinii* Hemsl. in F. Godman and O. Salvin, Biol. cent.-amer., Bot. 2:173. 1881. — *Lasianthaea salvinii* (Hemsl.) B. L. Turner, Phytologia 65:367. 1988. — TYPE: Guatemala, Volcán de Fuego, 5300 ft. [1617 m], O. Salvin s.n. (K!; photograph and fragments ex K in US!).

ILLUSTRATION: none found.

Shrubs or suffrutices, mostly 1–3 m high; young stems 6–8-striate or -ribbed, usually densely and retrorsely hirsute; petioles 5–15(–30) mm long, not winged, leaf blades broadly lanceolate to ovate-elliptic, 8–12(–18+) cm long, 4–6(–10+) cm wide, bases narrowly to broadly cuneate or rounded, margins serrate, apices acute to acuminate, abaxial faces hirsutulous, adaxial faces more scabrellous; heads 1–3(–5) in terminal and axillary, umbelliform clusters; peduncles mostly 5–15 mm long at anthesis, elongating to 2–4 cm and dilating to 3–4+ mm diam. in fruit, densely and retrorsely hirsute; involucre broadly campanulate at anthesis, becoming hemispheric in fruit; outer phyllaries 5–8, proximally indurate, distally herbaceous, obovate to oblong or spatulate, 12–18+ mm long, scabrellous, the inner 8–13, chartaceous, ovate to oblong, 6–8 mm long, glabrous or nearly so; paleae stramineous, 9–11 mm long; ray florets 8–13, corollas pale yellow, tubes ca. 3 mm long, laminae 12–15+ mm long; disc florets 30–60+, corollas yellow, often darker than rays, tubes 2.5–3 mm long, throats narrowly funneliform, 5.5–7 mm long, lobes deltate, 0.8–1 mm long,

abaxially scabrellous; anthers and appendages blackish; style branches ca. 3.5 mm long, attenuate and hispidulous distally; cypselae all blackish beneath a stramineous to reddish brown, smooth to warty, corky to spongy tissue that extends into the wings on the angles, the bodies cuneate in outline, those of the ray triquetrous in cross section, 3–4 mm long, those of the disc flattened-quadrate in cross section, 3.5–5 mm long, wings extending onto pappus awns; pappi of 2–3, stout awns 2–3 mm long over the angles of the cypselae plus 0–4 intercalated, free

or \pm connate squamellae 0.5–1 mm long; $2n = 32$; flowering Jun–Dec.

Steep, wooded slopes and canyon walls in Montane Rain and Evergreen Cloud forests; uncommon in eastern Sierra Madre; 2100–2500 m. Southern Mex. (Chis.), Guat., Hond. CHIAPAS COLLECTIONS: *EM* 742 (US, MICH, MO); *EM* 2477 (MICH, US); *SI* 2373 (TEX); 25878; 29480; 41659; 46157; 46233; 47694; 65571.

41. MELAMPODIUM

Melampodium L., Sp. pl. 921. 1753. — TYPE: *Melampodium americanum* L.
For synonymy, see Stuessy 1972.

Annuals or perennials, sometimes suffruticose, mostly less than 1 m high; leaves opposite, sessile or petiolate, blades linear to ovate, margins entire, toothed, or pinnatifid, abaxial faces strigillose, pilose, or sericeous, often gland-dotted, sometimes glabrescent, adaxial faces strigillose to pilose, sometimes glabrescent; heads borne singly, terminal, sessile or on slender, ebracteolate peduncles, often overtopped by axillary shoots and heads ultimately disposed in loose paniculiform associations; peduncles often crozierlike; involucre obscurely biserial, the outer 2–5 phyllaries (comprising the involucre proper) ovate to lanceolate, herbaceous, sometimes scarious-margined, mostly 3–6 mm long, the inner phyllaries closely investing the ray ovaries, each forming a “perigynium” (cypsel plus “perigynium” shed as a unit, here termed “fruit”); receptacles cone-topped cylinders, the cone together with paleae and disc florets commonly shed as a single unit; paleae mostly membranous to scarious, each infolding the subtended disc floret or its sterile ovary, often dilated and erose or denticulate apically; ray florets 3–13, pistillate, fertile, corollas yellow to orange or white, sometimes tinged with green or purple abaxially, tubes very short, laminae orbicular to oblong, mostly 2–12 mm long; disc florets (3–)12–120, functionally staminate, corollas yellow to orange, glabrous or pubescent, tubes about equal to the funnellform throats, lobes (4–)5, often reflexed, commonly each papillate-tufted adaxially at apex; styles undivided or minutely bifid, distally papillate to minutely hirsutulous; “fruits” (cypsel plus infolding inner phyllary) blackish to brown with paler ridges and tuberculae or smooth, laterally compressed, pyriform to D-shaped in outline, glabrous or with stout hairs, “perigynium” sometimes apically appendaged, a proper pappus wanting; $x = 9, 10, 11, 12$.

About 40 species; mostly in Mexico and Central America; ranging from southwestern United States (Colo., Kans., Ariz., N. Mex., Tex., Okla.) to Colombia; disjunct to Brazil; sporadically adventive in California, Antilles, Manila, Philippines, and Burma. Related to *Sigesbeckia* and *Smallanthus*.

REFERENCE: STUESSY, T. F. 1972. Revision of the genus *Melampodium* (Compositae: Heliantheae). *Rhodora* 74:1–70, 161–219.

- a. Outer phyllaries 3 (some heads may have 5).
 - b. Ray florets 3–5+, corolla laminae less than 2 mm long; disc florets mostly 8–20 8. *M. paniculatum*
 - bb. Ray florets mostly 5–8, corolla laminae more than 2 mm long; disc florets 25–50.
 - c. Leaves sessile, some with auriculate-dilated bases 3. *M. gracile*
 - cc. Leaves petiolate to subsessile, obtusely to narrowly cuneate at base 6. *M. microcephalum*
- aa. Outer phyllaries (involucre proper) 5.
 - d. Leaf blades, or lobes, mostly 1–6(–9) mm wide; abaxial leaf surfaces silvery, silky-sericeous.
 - e. Phyllaries scarious-margined; leaf blades or lobes mostly 1–3 mm wide 4. *M. linearilobum*
 - ee. Phyllaries not scarious-margined; leaf blades or lobes mostly 4–8 mm wide.
 - f. Ray laminae 4–7 mm long; disc florets mostly 40–80 1. *M. americanum*
 - ff. Ray laminae 0.8–2.3 mm long; disc florets mostly 5–12 10. *M. sericeum*
 - dd. Leaf blades mostly more than 1 cm wide, rarely narrower; abaxial leaf surfaces strigose to pilose, sometimes glabrescent.
 - g. Bases of proximal leaves connate-perfoliate; “fruits” mostly 4–7 mm long 9. *M. perfoliatum*
 - gg. Bases of proximal leaves not connate-perfoliate; “fruits” mostly less than 4 mm long.
 - h. Perennials from rhizomatous caudices: phyllaries scarious-margined; disc florets 80–110; “fruits” less than 2 mm long 7. *M. montanum*
 - hh. Annuals (seldom persisting); phyllaries not scarious-margined; disc florets 20–80; “fruits” mostly 2–4 mm long.

- i. Leaf blades sparsely scabrelous to hirsutulous, sometimes glabrescent, not pilose, not gland-dotted; ray florets 8–13, laminae 3–9 mm long 2. *M. divaricatum*
- ii. Leaf blades silky pilose with fine hairs 0.5–1.5 mm long and minutely gland-dotted abaxially; ray florets 3–8, laminae 2.5–3.5 mm long 5. *M. longipilum*

1. *Melampodium americanum* L., Sp. pl. 921. 1753.

— TYPE: Mexico, Veracruz, near Veracruz, Mar 1731, *W. Houstoun s.n.* (BM; isotype: BM).

Melampodium heterophyllum Lag., Gen. sp. pl. 33. 1816. — TYPE: Grown in Madrid from seed of uncertain origin (MA, fide Stuessy 1972).

Melampodium sericeum Kunth, Nov. gen. sp., ed. fol. 4:213, t. 398. 1820 [1818]; ed. qto. 4:272. 1820, non Lag. 1816. — *Melampodium kunthianum* DC., Prodr. 5:519. 1836. — TYPE: Mexico, Guerrero, between Tehuilotepic and Taxco, Apr 1803, *A. J. A. Bonpland 3968* (P, microfiche!; isotypes: P, US).

Melampodium angustifolium DC., Prodr. 5:519. 1836. — TYPE: Given as from Peru, surely from Mexico, see Stuessy 1972.

Melampodium nelsonii Greenm., Proc. Amer. Acad. Arts 41:260. 1905. — LECTOTYPE: (Stuessy 1972:22): Mexico, Michoacán, Volcano of Jorullo, 28 Mar 1903, *E. W. Nelson 6939* (GH; isoelectotypes: NY, US).

ILLUSTRATION: see synonymy.

Perennials, herbaceous to suffrutescent, mostly 1–6 dm high; leaves lance-linear or with 1–5 lance-linear lobes, blades 2–9 cm long, mostly 2–9 mm wide, abaxial faces silky-sericeous and minutely gland-dotted, adaxial faces closely strigillose; peduncles 3–7 cm long; outer phyllaries 5, mostly ovate, often acuminate, 5–7 mm long, herbaceous, shaggily pilose; paleae chartaceous, stramineous to purplish, ca. 4.5 mm long, apically dilated and truncate to rounded, erose-denticulate; ray florets 8–13, corollas orange-yellow, tubes ca. 0.3 mm long, laminae oblong, 4–7 mm long, shortly 3-toothed, sub-sericeous abaxially; disc florets mostly 40–80, corollas yellow, sparsely hirsutulous, ca. 2.5 mm long, tubes ca. 0.7 mm long, throats funnelform, ca. 0.8 mm long, lobes lance-ovate, ca. 1 mm long, each adaxially papillate-tufted at tip; styles minutely bifid, papillate-dilated in distal 0.7 mm; “fruits” blackish with paler ribs and tubercles, attached near their bases, 2–3 mm long excluding corona-like, sometimes aristate, appendage 1–3 mm long, lateral faces ± oblong in outline; $2n = 20$; flowering Jun–Dec.

Open, sometimes disturbed places in Evergreen Seasonal, Tropical Deciduous, and Thorn forests and in Savanna; scattered in Central Depression and extending onto Northern Highlands; 730–1200 m. Mex. (Tam., Sin., Dgo., S.L.P., Nay., Jal., Cma., Mich., Méx., Vewr., Gro., Oax., Chis.), Guat. CHIAPAS COLLECTIONS: *Calz 3429* (TEX); *H&F 4175* (TEX); *H&F 4185* (TEX); *RMK 2980* (DS, NY, TEX, UC, US); *RMK 2987* (DS, NY, TEX, UC, US); *RMK 3105* (DS, NY, TEX, UC, US); *RMK 3109* (DS, TEX, UC); *Neff 93-4-11-3* (TEX); *Stu 571* (TEX); *Stu 572* (TEX); *Stu 631* (TEX); *Stu 632* (TEX); *Sund 2471* (TEX); *10276*; *19799*; *20104*; *25654*; *36544*; *36596*; *38276*; *48988*.

2. *Melampodium divaricatum* (Rich.) DC., Prodr. 5:520. 1836.

— *Dysodium divaricatum* Rich. in C. H. Persoon, Syn. pl. 2:489. 1807. — *Eleutheranthera divaricata* (Rich.) Millsp., Publ. Field Mus. Nat. Hist., Bot. Ser. 1:53. 1895. — LECTOTYPE: (Stuessy 1972:175): Colombia, “Gairam, prope St. Martham,” 1785–1789, *L. C. M. Richard s.n.* (P; isoelectotype: P).

Melampodium paludosum Kunth, Nov. gen. sp., ed. fol. 4:215. 1820 [1818]; ed. qto. 4:237. 1820. — TYPE: Panama, “in humidis prope ostia fluminis Sinu, juxta litora Dariensis,” Mar 1801, *A. von Humboldt and A. J. A. Bonpland 1421* (P, microfiche!; isotype: P).

Melampodium berterianum Spreng., Syst. veg. 3:619. 1826. — TYPE: Colombia (“Ind. Occ.”), near Sta. Martha, *C. G. Bertero s.n.* (P; isotypes: G-DC, GH?).

Alcina minor Cass. in F. Cuvier, Dict. sci. nat., ed. 2. 59:243. 1829. — TYPE: Grown in Paris from Mexican seed (P?).

Melampodium pumilum Benth., Pl. hartw. 64. 1840. — TYPE: Mexico, locality unknown, 1830, *G. J. Graham 5* (K; isotype: GH).

Melampodium tenellum Hook. & Arn. var. *flaccidum* Benth., Bot. voy. Sulphur 115. 1845. — *Melampodium flaccidum* (Benth.) Benth., Vidensk. Meddel. Dansk Nathurhist. Foren. Kjøbenhavn 4:86. 1853. — LECTOTYPE: (Stuessy 1972:176): Mexico, Nayarit, Tepic, 1844, *A. Sinclair s.n.* (K; isoelectotype: K).

Melampodium divaricatum (Rich.) DC. var. *macranthum* Schltdl., Linnaea 24:198. 1851. — TYPE: Grown in Turin from Guatemalan seed sent by *J. von Warscewicz* (HAL; isotype: W).

Melampodium copiosum Klatt, Bot. Jahrb. Syst. 8:41. 1887. — TYPE: Guatemala, Alta Verapaz, near Cobán, 1300 m, Feb 1882, *F. C. Lehmann 1434* (GH; isotypes: F, G, K, US).

Melampodium panamense Klatt, Bot. Jahrb. Syst. 8:42. 1887. — TYPE: Panama, “ad margines silvarum,” 20 Aug 1880, *F. C. Lehmann 69* (GH; isotypes: G, K, US).

For additional synonymy, see Stuessy 1972.

ILLUSTRATIONS: Fig. 28; Ann. Missouri Bot. Gard. 62:1084. 1975 [Fl. Pan.].

Annuals or short-lived perennials, 1–5(–10) dm high; leaves subsessile or short-petiolate, blades narrowly lanceolate to ovate or trullate, 2–8(–15) cm long, 1–4(–7) cm wide, margins subentire to serrate, faces sparsely scabrelous to hirsutulous or glabrescent, not gland-dotted; heads borne singly, terminal on peduncles 1–8(–15) cm long, the peduncles mostly over-topped by axillary shoots, capitulescences ultimately loosely corymbiform; outer phyllaries 5, broadly ovate, 3–6 mm long, herbaceous-membranous, tomentose, sometimes glabrescent; paleae narrowly obovate, 2–4 mm long, entire or erose-denticulate apically; ray florets 8–13, corollas yellow, often greenish abaxially at tips, tubes ca. 0.5 mm long, puberulent, laminae narrowly ovate to oblong, 3–9 mm long; disc florets 30–80, corollas ochroleucous proximally, yellow distally, 2.5–3.5 mm

long, tubes 1.1–1.5 mm long, throats slightly ampliate, funnel-form, 0.8–1.4 mm long, lobes rounded-deltate, 0.4–0.7 mm long, each with tuft of multicelled hairs adaxially at tip; styles papillate-hispidulous on distal 0.7–1.3 mm; “fruits” brown, attached near middle of their adaxial facets, 2.7–4.1 mm long, lateral faces \pm quadrate, margins and faces irregularly tuberculate or ridged, glabrous; $2n = 24$; flowering mostly Jul–Nov.

Ruderal, along roads, in fields, etc., in Tropical Rain, Lower Montane Rain, Montane Rain, Evergreen Seasonal, Tropical Deciduous, Pine-Oak-*Liquidambar*, and Pine-Oak forests; common in Northern Highlands, on Central Plateau, and in Central Depression, uncommon on Pacific Coastal Plain; 300–1700 m. Mex. (Baja C.S., N.L., Tam., Sin., S.L.P., Nay., Jal., Gto., Hgo., Cma., Mich., Méx., D.F., Mlos., Pue., Ver., Gro., Oax., Tab., Camp., Yuc., Q. Roo, Chis.), Guat. to Pan.; S.A. (Col.); adventive in Antill., Braz., Burma. CHIAPAS COLLECTIONS: *Calz 3515* (TEX); *C 67-306* (CAS); *Cro 47822* (MO, UC); *Fi 35286* (TEX); *H&F 4182* (TEX); *RMK 2986* (TEX, UC); *RMK 3101* (DS, TEX, UC); *RMK 3125* (TEX, UC); *RMK 3434* (DS, NY, RSA, TEX, UC); *RMK 3436* (DS, TEX, UC); *L 834* (DS); *MV B-69* (CAS); *Nee 32298* (TEX); *Neff 93-4- 17-4* (TEX); *Och 4319* (CAS); *Pa 659* (CAS); *Pa 1343* (OAX, UC); *Prat 1100* (CAS, TEX); *SC 107* (CAS, TEX); *SC 245* (TEX); *SI 2294* (TEX); *SI 2387B* (TEX); *SI 2398* (TEX); *Stu 550* (TEX); *Stu 553* (TEX); *Stu 554* (TEX); *Stu 564* (TEX); *Stu 626* (TEX); *T 1399* (DS); *T 1561* (DS); *T 1606* (DS); *T 2673* (CAS); *T 4452* (CAS); *T 6035* (CAS); *6381*; *7536*; *10620*; *13438*; *16125*; *19856*; *19913*; *20015*; *22273*; *26220*; *29008*; *36624*; *37221*; *37672*; *46106*; *46882*; *47154*; *49229*; *52154*; *52688*; *69933*.

3. *Melampodium gracile* Less., Linnaea 6:407. 1831.

— LECTOTYPE (Stuessy 1972:164): Mexico, Veracruz, Papantla, Jan 1829, C. J. W. Schiede and F. Deppe 1254 (HAL; isocototypes: HAL, MO, P, W).

Melampodium oblongifolium DC., Prodr. 5:519. 1836. — *Melampodium gracile* Less. var. *oblongifolium* (DC.) A. Gray, Proc. Amer. Acad. Arts 5:182. 1861. — TYPE: Mexico, Veracruz, “rancho de los huevos,” near Tantoyuca, Jan 1832, J. L. Berlandier 2153 (or 733) (G-DC, microfiche!; isotypes: F, G, GH, K, MO, P).

Melampodium microcarpum S. F. Blake, Contr. U.S. Natl. Herb. 22:606. 1924. — TYPE: Mexico, Tamaulipas, near Gómez Farias, ca. 350 m, 13–21 Apr 1907, E. Palmer s.n. [319]. (US; isotypes: GH, MO).

ILLUSTRATION: none found.

Annuals, 1–5 dm high; leaves sessile or, proximal ones at least, with auriculate-dilated, subclasping petiole bases, blades lance-ovate to narrowly triangular or pandurate, 2–6(–12) cm long, margins subentire to irregularly toothed, faces sparsely strigose or scabrellous to glabrescent, not gland-dotted; heads on peduncles 2–6(–12) cm long, overtopped by axillary shoots, ultimately corymbiformly disposed; outer phyllaries 3(–5), ovate and acute to lanceolate, mostly 3–5 mm long, herbaceous-membranous, sparsely scabrellous and stipitate-glandular; paleae narrowly lanceolate, ca. 2.5 mm long; ray florets 5–8, corollas yellow with greenish nerves abaxially, tubes ca. 0.3 mm long, laminae ovate, (2–)3–5 mm long, deeply bifid; disc florets 20–50, corollas translucent proximally, yellow distally,

ca. 2.5 mm long, tubes ca. 1.2 mm long, very slender, throats ampliate, funnel-form, ca. 0.8 mm long, lobes rounded-deltate, 0.4 mm long, each papillate-tufted adaxially at apex; styles hispidulous on distal 0.7 mm; “fruits” dark brown, attached near their bases, ca. 2.5 mm high, lateral faces \pm quadrate, margins and faces irregularly ridged; $2n = 18$; flowering Jul–Dec.

Ruderal, roadsides, etc., in Tropical Deciduous Forest; rare on Central Plateau; uncommon in Central Depression and on W Pacific Coastal Plain; 200–1170 m. Southern and eastern Mex. (Tam., S.L.P., Jal., Hgo., Cma., Mich., Méx., Mlos., Pue., Ver., Gro., Camp., Yuc., Chis.), Guat., Bel. CHIAPAS COLLECTIONS: *B&P 320* (TEX); *RMK 3042* (DS, NY, TEX, UC, US); *RMK 3096* (DS, NY, TEX, UC, US); *LeD 2174* (LL); *Stu 562* (TEX); *Stu 563* (TEX); *Stu 573* (TEX); *Stu 574* (TEX); *20014*; *20034*; *26221*; *26906*; *28032*; *37377*; *42260*; *51902*; *53669*.

4. *Melampodium linearilobum* DC., Prodr. 5:518. 1836.

— TYPE: Mexico, “ad Guilotepec et Las Bacas,” Sep 1831, L. Alaman s.n. (G-DC, microfiche!; isotype: G).

Melampodium canescens Brandegee, Zoe 5:222. 1905. — TYPE: Mexico, Sinaloa, Cofradía, 22 Oct 1904, T. S. Brandegee s.n. (UC!; isotypes: GH, POM, US).

ILLUSTRATION: none found.

Annuals, 1–5 dm high; leaves pinnatifid with 4–8 lobes or entire, blades or lobes linear, 3–12(–40) mm long, mostly 1–3 mm wide, abaxial faces silky-sericeous and minutely gland-dotted, adaxial faces strigillose; peduncles 3–6 cm long; outer phyllaries 5, ovate to truncate or oblanceolate, 3–6 mm long, conspicuously scarious-margined, shaggily pilose; paleae yellow or purplish, narrowly spatulate, ca. 4 mm long, scarious, apically erose; ray florets mostly 8, corollas pale yellow to orange, tubes ca. 0.3 mm long, laminae orbicular to ovate, 2–4 mm long, sparsely pilose abaxially; disc florets 20–80, corollas yellow, ca. 2.5 mm long, sparsely hirsutulous, tubes ca. 0.8 mm long, throats funnel-form, ca. 0.8 mm long, lobes ca. 0.9 mm long, each papillate-tufted adaxially at tip; styles conically papillate on distal 0.4 mm; “fruits” blackish with paler ribs and tubercles, pyriform, ca. 2 mm long, bearing a short, entire to 3-toothed corona 1–3 mm long; $2n = 20$; flowering Jul–Oct.

Brushy slopes or open places in Seasonal Evergreen and Tropical Deciduous forests and in Savanna; scattered and uncommon in Central Depression, in Sierra Madre, and on Pacific Coastal Plain; 60–1250 m. Mex. (Sin., Mich., Méx., Gro., Oax., Chis.), Guat., Hond., Salv., Nic., C.R. CHIAPAS COLLECTIONS: *C 467* (DS); *H&F 4186* (TEX); *L 1317* (DS); *EM 4444* (F, LL); *EM 4504* (LL); *EWN 2949* (GH, US); *P 9113* (UC); *SI 2279* (TEX); *SI 2287* (TEX); *36895*; *37540*; *37663*; *40568*; *51867*; *52867*.

5. *Melampodium longipilum* B. L. Rob., Proc. Amer. Acad. Arts 27:173. 1892.

— TYPE: Mexico, San Luis Potosí, San José Pass, 1 Jul 1890, C. G. Pringle 3639 (GH).

Melampodium villicaule Greenm., Publ. Field Mus. Nat. Hist., Bot. Ser. 2:345. 1912. — TYPE: Mexico, Guerrero, Río Balsas, 26 Aug 1910, C. R. Orcutt 4386 (F).

ILLUSTRATION: none found.

Annuals, mostly 5–35 cm high; leaves lance-elliptic to ovate, 1–3(–8) cm long including petiole, 5–12(–35) mm wide, margins entire, faces silky-pilose with very fine hairs 0.5–1.5 mm long, the abaxial minutely gland-dotted; peduncles 1–6+ cm long; outer phyllaries 5, lance-ovate to trullate, 2.5–4.5+ mm long, herbaceous, pilose; paleae linear to cuneate, 3–4 mm long, truncate to slightly rounded, erose-denticulate; ray florets 3–8, corollas yellow to orange, tubes ca. 0.8 mm long, laminae ovate to elliptic, 2.5–3.5 mm long, minutely 2–3-toothed; disc florets 20–60, corollas yellow distally, ca. 2 mm long, tubes ca. 0.7 mm long, throats ampliate, funnellform, ca. 0.8 mm long, lobes rounded-deltate, ca. 0.5 mm long, each papillate-tufted adaxially at tip; styles minutely hispidulous on distal 0.5 mm; “fruits” dark brown with paler bumps and ridges, attached at bases of their adaxial edges, 2–3 mm long, abaxially convex, capped with a lance-attenuate, often coiled appendage 1–5+ mm long; $2n = 20$; flowering Sep–Oct.

Dry, shrubby slopes in Tropical Deciduous Forest; uncommon on lower Central Plateau and in E Central Depression; 600–1550 m. Mex. (S.L.P., Hgo., Gro., Pue., Oax., Chis.), Guat. CHIAPAS COLLECTIONS: 13171; 20074; 40497; 46069; 46405; 46427; 47008.

6. *Melampodium microcephalum* Less., Linnaea 9:268. 1834.

— TYPE: Mexico, Veracruz(?), Hacienda de la Laguna, Jul 1829, C. J. W. Schiede s.n. [217] (HAL; isotype: P).

Melampodium lanceolatum Sessé & Moc., Fl. Mex., ed. 2. 196. 1894, non DC., Prodr. 5:519. 1836. — LECTOTYPE (Stuessy 1972:167): Mexico, *M. Sessé et al. s.n.* [3978] (MA; isoelectotype: MA).

ILLUSTRATION: none found.

Annuals, 1–3(–8) dm high; leaves subsessile or short-petioled, blades mostly ovate to lanceolate, 2–5(–9) cm long, 1–2(–3) cm wide, cuneate toward base, margins entire to remotely serrate, faces subglabrous to sparsely scabrelous or strigillose, not gland-dotted; heads on slender peduncles 1–6 cm long, overtopped by axillary shoots, ultimately disposed in corymbiform or paniculiform associations; outer phyllaries 3(–5), lanceolate to ovate-attenuate, 3–6 mm long, herbaceous, sparsely scabrelous and minutely stipitate-glandular; paleae oblanceolate, ca. 2.5 mm long; ray florets 5–8, corollas pale yellow with greenish nerves abaxially, tubes ca. 0.1 mm long, laminae suborbicular to elliptic, 2.5–3.5+ mm long, deeply bifid; disc florets ca. 25–50, corollas yellow distally, ca. 2.5 mm long, tubes very slender, ca. 1.2 mm long, throats funnellform, ca. 0.7 mm long, lobes rounded-deltate, ca. 0.6 mm long, each papillate-tufted adaxially at tip; styles minutely hispidulous on distal 0.7 mm; “fruits” dark to greenish brown with paler bumps and ridges, attached near their bases, 1.7–2.4 mm long, somewhat rounded-arcuate abaxially, lateral faces \pm quadrate; $2n = 18$; flowering Oct.

Ruderal(?), sometimes in Mangrove Swamp; rare in Sierra Madre and on Pacific Coastal Plain; 3–1450 m. Mex. (Jal. to Ver., Oax., Chis.), Guat. CHIAPAS COLLECTIONS: *Sl* 2365 (TEX); *Stu* 627 (TEX); *Stu* 628 (TEX); 20795.

7. *Melampodium montanum* Benth., Pl. hartw. 64. 1840.

— TYPE: Mexico, Oaxaca, “In summo jugo (Cumbre) inter Oaxaca et la Sierra,” 1839, C. T. Hartweg s.n. [475] (K).

Melampodium liebmannii Schultz-Bip. ex Klatt, Leopoldina 23:89. 1887. — TYPE: Mexico, Oaxaca, “Cumbre de Estepa et Yavesia,” Jun 1842, F. M. Liebmann s.n. [232] (P; isotype: P).

Melampodium montanum Benth. var. *viridulum* Stuessy, Rhodora 74:191. 1972. — TYPE: Mexico, Chiapas, ca. 5 miles [8 km] east of San Cristóbal de Las Casas on route 190, 11 Jun 1960, R. M. King 2801 (US; isotypes: DS!, NY, TEX, UC!).

ILLUSTRATION: none found.

Perennials, sometimes suffrutescent, mostly 1–3 dm high from rhizomatous caudex, stems often purple; leaves sessile or short-petioled, blades lance-elliptic to ovate, 1–4 cm long, 7–22 mm wide, margins entire, faces subglabrous to strigose or villous; heads mostly borne singly on peduncles 2–7 cm long; outer phyllaries 5, broadly ovate, membranous with narrow scarious margins, 3–5 mm long, glabrous or sparsely villous; paleae oblanceolate, ca. 2 mm long; ray florets 7–13, corollas pale yellow, tinged with green or purple abaxially, tubes ca. 0.8 mm long, laminae linear-elliptic, 4–8 mm long; disc florets ca. 80–110, corollas greenish yellow, ca. 2.7 mm long, tubes 0.6–0.8 mm long, throats funnellform, 1.6–1.8 mm long, lobes rounded-deltate, ca. 0.3 mm long, not papillate-tufted; styles papillate on distal 0.8 mm; “fruits” blackish, attached near their bases, 1.6–1.8 mm long, D-shaped in outline, corolla insertion ca. medial on adaxial facet, faces smooth to obscurely roughened; $2n = 22$; flowering mostly Jul–Oct.

Rocky or grassy slopes in Evergreen Cloud, Pine-Oak-Liquidambar, and Pine-Oak forests; common in S Northern Highlands and on Central Plateau; 1600–2600 m. Mex. (N.L., Tam., S.L.P., Jal., Qro., Hgo., Mich., Méx., Pue., Oax., Chis.), Guat. CHIAPAS COLLECTIONS: *C* 91 (DS); *C* 508 (DS); *C* 700625-86 (UCR); *Cro* 40485 (UC); *Da* 9522 (LL); *Go* 914 (US); *GG* 181 (CAS); *RMK* 2796 (DS, NY, TEX, UC, US); *RMK* 2801 (DS, UC); *RMK* 2843 (TEX); *L* 1050 (DS); *L* 1422 (DS); *L* 1755 (DS); *L* 1895 (DS); *EM* 6002 (F, LL); *M&L* 586 (CAS); *SR* 79 (CAS); *SR* 895 (CAS); *Sl* 2320 (TEX); *Stu* 559 (TEX); *Stu* 560 (TEX); *Stu* 566 (TEX); *Stu* 567 (TEX); *Stu* 568 (TEX); *Stu* 569 (TEX); *Stu* 570 (TEX); *T* 962 (DS); *T* 1023 (DS, LL); *T* 9792 (TEX); *We* 17772 (UC); *Z* 7 (TEX); 6006; 8906; 12522; 12802; 37316; 46354; 51404.

8. *Melampodium paniculatum* Gardn., London J. Bot. 7:287. 1848.

— TYPE: Brazil, Goiás, near Arrias, 1840, G. Gardner 3844 (K; isotypes: F, G, NY, P, W).

Melampodium brachyglossum Donn.Sm., Bot. Gaz. 13:74. 1888. — LECTOTYPE (Stuessy 1972:170): Guatemala, Alta Verapaz, Cobán, H. von Tuerckheim 114 (US; isoelectotype: US).

ILLUSTRATION: none found.

Annuals, 1–10 dm high; leaves petiolate or sessile, blades narrowly lanceolate to trullate or ovate, 2–5(–9) cm long,

1–2(–4) cm wide, bases usually cuneate to rounded, rarely auriculate, margins entire or remotely toothed, faces sparsely strigillose, sometimes glabrescent, not gland-dotted; heads on terminal peduncles 1–5 cm long, overtopped by axillary shoots, ultimately corymbosely or paniculately disposed; outer phyllaries 3, lanceolate to ovate-attenuate, mostly 2–4 mm long, herbaceous-membranous, sparsely strigillose and minutely stipitate-glandular; paleae oblanceolate, ca. 2 mm long; ray florets mostly 3–5, corollas pale yellow, often with nerves and apices greenish abaxially, tubes ca. 0.1 mm long, laminae ovate to orbicular, deeply bifid, less than 2 mm long; disc florets mostly 8–20, corollas pale yellow distally, ca. 2 mm long, tubes ca. 1 mm long, throats funnelform, ca. 0.6 mm long, lobes rounded-deltate, ca. 0.4 mm long, often reflexed, each papillate-tufted adaxially at tip; styles minutely hispidulous on distal 0.5 mm; “fruits” greenish brown with paler ridges and bumps, attached near their bases, 2–3 mm long, lateral faces quadrate-rounded; $2n = 36, 54$; flowering mostly Jul–Dec.

Brushy slopes, roadsides, cornfields, etc., in Tropical Rain, Pine-Oak–*Liquidambar*, and Pine-Oak forests; uncommon in S Northern Highlands, in Eastern Highlands, on Central Plateau, and in Sierra Madre; (300–)1300–1900 m. Mex. (Chis.), Guat., Hond., Salv., C. R.; isolated (adventive?) localities in Col. and Braz. CHIAPAS COLLECTIONS: *S* 3360A (TEX); *MC* 2254 (F); *C* 419 (DS); *Pa* 1296 (CAS); *PM* 214 (CAS, TEX); *SC* 185 (CAS); *BLT* 15448 (TEX); 6085; 7861; 11056; 12855; 13050; 14453; 21121; 22295; 29541; 34281; 36944; 37861; 46322; 49460; 49944; 51507; 52494; 70450.

9. *Melampodium perfoliatum* (Cav.) Kunth, Nov. gen. sp., ed. fol. 4:215. 1820 [1818]; ed. qto. 4:274. 1820.

— *Alcina perfoliata* Cav., Icon. 1:11, t. 15. 1791. — *Wedelia perfoliata* (Cav.) Willd., Sp. pl. 3:2335. 1803. — *Polymnia perfoliata* (Cav.) Poir. in J. Lamarck, Encycl. 5:506. 1804. — *Melampodium connatum* Sessé & Moc. ex DC., Prodr. 5:521. 1836, pro syn. sub *Melampodium perfoliatum*. — LECTOTYPE: (Stuessy 1972:194): Grown in Madrid from Mexican seed (MA; isolectotype: MA).

ILLUSTRATION: none found.

Mostly annuals, sometimes persisting, suffrutescent, 2–15(–25) dm high; leaves sessile, petiole bases of the proximal leaves connate-perfoliate, blades mostly broadly deltate to truncate, 5–15(–21) cm long, 3–9(–15) cm wide, margins serrate, faces sparsely strigose, sometimes glabrate, the abaxial usually gland-dotted; heads borne singly, terminal, peduncles 3–8 cm long, often overtopped by axillary shoots and heads then disposed in bracteate paniculiform associations; outer phyllaries 5, herbaceous-foliaceous, ovate to oblong, 12–17(6–20) mm long; paleae narrowly elliptic, ca. 2 mm long; ray florets 8–13, corollas yellow to orange, tube ca. 0.5 mm long, lamina narrowly elliptic, 3–5 mm long; disc florets 30–50, corollas pale yellow, ca. 2.5 mm long, glabrous, tubes ca. 1.2 mm long, throats funnelform, ca. 0.8 mm long, lobes rounded-triangular, each with subsessile gland-tipped hairs but not papillate-tufted at tip; styles unbranched, distally dilated, conically papillate-hispidulous;

lous; “fruits” greenish brown, attachment nearly basal, 4–7 mm long, lateral faces D-shaped, glabrous but for 4–6 tubercles or spiculate hairs scattered about the apex; $2n = 22, 24$; flowering Aug–Oct.

Moist slopes in Evergreen Seasonal and Pine-Oak forests; uncommon on Central Plateau and in Central Depression, rare in Sierra Madre; 1300–2200 m. Mex. (Chih., Sin., Dgo., Zac., S.L.P., Nay., Jal., Aguasc., Gto., Cma., Mich., Méx., D.F., Mlos., Pue., Ver., Gro., Oax., Chis.), Guat., C.R.; adventive in Calif. and Cuba. CHIAPAS COLLECTIONS: *Calz* 3755 (TEX) *GL* 485 (CAS, TEX); *Lo* 460 (CAS); *PL* 1044 (CAS); *SC* 768 (CAS, TEX); *SR* 1044 (TEX); *T* 4566 (CAS); *T* 8159 (TEX); 6219; 29171; 39762.

10. *Melampodium sericeum* Lag., Gen. sp. pl. 32. 1816.

— TYPE: Grown in Madrid from seed sent from Mexico by Sessé and Mociño (MA ?; isotype: G-DC).

Melampodium hispidum Kunth, Nov. gen. sp., ed. fol. 4:214, t. 399. 1820 [1818]; ed. qto. 4:273. 1820. — TYPE: Mexico, Michoacán, between Patzcuaro and Valladolid (Morelia), *A. von Humboldt and A. J. A. Bonpland s.n.* (P, microfiche!).

Melampodium sericeum Lag. var. *brevipes* A. Gray, Proc. Amer. Acad. Arts 36:459. 1901. — TYPE: Mexico, San Luis Potosí, “near Morales.” Aug 1876, *J. G. Schaffner* 271 (GH).

ILLUSTRATION: none found.

Annuals, mostly 1–4 dm high; leaves sessile or essentially so, blades narrowly oblanceolate, 2–6 cm long, mostly 4–8 mm wide, margins all entire or some with 1–4 lateral lobes, abaxial faces silky-sericeous and minutely gland-dotted, adaxial faces sparsely strigose; heads borne singly or somewhat aggregated, often overtopped by axillary shoots; peduncles 0–20 mm long; outer phyllaries 5, obovate to oblanceolate, 3–7 mm long, herbaceous, shaggily pilose; paleae stramineous to purplish, narrowly cuneate, truncate-rounded and erose at tip; ray florets 5–8, corollas yellow, sometimes purple-tinged, tubes ca. 0.3 mm long, laminae ovate, 0.8–2.3 mm long, shaggily pilose abaxially; disc florets mostly 5–12, corollas pale yellow, sparsely pilose, tubes ca. 0.8 mm long, throats funnelform, ca. 0.8 mm long, lobes bluntly deltate, 0.6 mm long, each papillate-appendaged at tip; styles minutely papillate on distal 0.4 mm; “fruits” blackish with paler bumps and ridges and a crownlike, mucous or somewhat attenuate appendage, bodies attached near their bases, ca. 3 mm long, appendages ca. 1 mm long; $2n = 60$; flowering Aug–Nov.

Streambanks and other disturbed habitats in Tropical Deciduous and Pine-Oak forests; rare or uncommon on E Central Plateau and in Sierra Madre; 860–1750 m. Western and southern Mex. (Son., Chih., Sin., Dgo., Zac., S.L.P., Nay., Jal., Aguasc., Gto., Oro., Cma., Mich., Méx., D.F., Mlos., Pue., Gro., Oax., Chis.), Guat., Salv. CHIAPAS COLLECTIONS: *D' A* 12107 (MO, UC); 12161; 37903; 40580; 46095; 47012; 52628; 54921.

42. MELANTHERA

Melanthera Rohr, Skr. Naturhist.-Selsk. 2:213. 1792. — LECTOTYPE (Strother 1970, Taxon 19:337): *Melanthera panduriformis* Cass. = *Melanthera nivea* (L.) Small. [Parks (1973) considered the type to be *Calea aspera* Jacq. = *Melanthera aspera* (Jacq.) Steud. ex Small, which I consider to be synonymous with *Melanthera nivea* (L.) Small.] See D'Arcy (1975), Parks (1973), and Wild (1965) for synonymy.

Erect, freestanding to clambering or climbing perennial herbs or suffrutices, exceptionally annuals, to 2+ m high; leaves opposite, petiolate or sessile, blades variable in shape, often 3-nerved from near their bases, margins variously toothed, faces mostly scabrous to hispid, exceptionally subglabrous; heads terminal or axillary, borne singly or in loose corymbiform associations; peduncles usually long, slender, ebracteate; involucre broadly hemispheric to saucer-shaped at anthesis, becoming everted in fruit; phyllaries mostly 8–16 in 2–3 series, strongly imbricate, proximally cartilaginous, distally herbaceous, mostly 4–8 mm long, usually strigose; receptacles dome-shaped to hemispheric; paleae mostly chartaceous, navicular, each infolding the subtended floret, usually with a hard, pungent apex; ray florets none [8–15, styliiferous and sterile or neuter, corollas yellow, commonly showily ligulate]; disc florets mostly 20–100+, bisexual, fertile, corollas white or pinkish [yellow], limb often hispidulous abaxially, tubes much shorter and slightly narrower than the slender, funnelform throats, lobes 5, narrowly triangular; style branches rather long, abaxially hispidulous, appendages hispidulous beyond the stigmas; anthers typically blackish; cypselae stoutly obpyramidal to obovoid, 3–4-angled or somewhat flattened, often minutely coronate around the truncate apex, faces mostly glabrous and minutely papillate-striate; pappi none or of 1–12, slender, equal or unequal, hispidulous to barbellulate, usually caducous, setae or coarse bristles; $x = 15$.

A complex and poorly understood genus of ca. 5–8 American and perhaps 15–20 African species.

REFERENCES: D'ARCY, W. G. 1975. *Melanthera*. Ann. Missouri Bot. Gard. 62:1113–1120; PARKS, J. C. 1973. A revision of North American and Caribbean *Melanthera* (Compositae). Rhodora 75:169–210; WILD, H. 1965. The African species of the genus *Melanthera* Rohr. Kirkia 5:1–17.

- a. Petioles 1–7 cm long, leaf blades mostly deltate to ovate, lengths (2–15 cm) mostly 2–5 times widths (1–12 cm) 2. *M. nivea*
 aa. Petioles 3–12 mm long, leaf blades mostly linear, lengths (3–10 cm) mostly 6–14 times widths (4–15 mm) 1. *M. angustifolia*

1. *Melanthera angustifolia* A. Rich. in R. Sagra, Hist. Isla Cuba 11:54. 1850.

— LECTOTYPE: (Parks 1973:198): Cuba, Isla de Pinos, *R. de La Sagra* s.n. (P).

Melanthera linearis S. F. Blake, Contr. U.S. Natl. Herb. 24:30. 1922. TYPE: Guatemala, Izabal, at Cristina, 22 May 1919, S. F. Blake 7601 (US).

Melanthera purpurascens S. F. Blake, Contr. U.S. Natl. Herb. 22:629. 1924. — TYPE: Mexico, Chiapas, Ocuilapa, 21 Aug 1895, E. W. Nelson 2995 (US).

For additional synonymy see D'Arcy (1975) and Parks (1973).

ILLUSTRATION: Rhodora 75:197. 1973.

Herbs, erect to procumbent, to 6+ dm high; petioles 3–12 mm long, leaf blades linear to very narrowly oblong, 3–10 cm long, 4–10(–15) mm wide, margins coarsely and irregularly toothed, faces scabrous to hispid with short and (fewer) longer, stiff, pointed hairs; heads 1–4 at ends of branches; peduncles 5–12 cm long, slender, ebracteate, strigose; involucre broadly hemispheric to saucer-shaped; phyllaries 8–15, ovate to broadly lanceolate, 3–6 mm long, cartilaginous, closely strigose; paleae chartaceous to scarious, ca. 5.5 mm long, stoutly pungent apically; ray florets none; disc florets 40–80+, corollas creamy white, purple-tinged distally, tubes ca. 1 mm long, throats slightly ampliate, ca. 3 mm long, lobes ca. 1 mm long; style branch appendages ca. 0.7 mm long; cypselae dull blackish brown, stoutly obpyramidal to somewhat flattened, ca. 2.5 mm

long; pappi of 2–4(+?), slender, hispidulous, fragile or caducous setae ca. 2 mm long; $2n = 30$; flowering Jul–Oct.

Wet or poorly drained places in Pine-Oak Forests and Savannas; uncommon in Northern Highlands, on Central Plateau, and on Gulf Coastal Plain; 100–1700 m. Southern Fla., southern Mex. (Yuc., Q. Roo, Chis.), Hond., Pan.; Bah. Is., Antill. CHIAPAS COLLECTIONS: 26656; 37909; 45956; 45988; 46830; 48164; 52553; 54924.

Some Chiapan collections (e.g., *D. E. Breedlove* 7964, 1 km N of Aguacatenango; *D. E. Breedlove* 38270, 14 km N of Ocozocoautla on road to Mal Paso; *D. E. Breedlove* 70630, 10–15 km W of Ocozocoautla) are intermediate between *Melanthera angustifolia* and *M. nivea*. Types of the two species may be conspecific.

2. *Melanthera nivea* (L.) Small, Fl. s.e. U.S. 1251, 1340. 1903.

— *Bidens nivea* L., Sp. pl. 833. 1753. — LECTOTYPE: (Parks 1973:184): Dellenius, J. 1732. Hortus Elth., tab. 47. *Calea aspera* Jacq., Collectanea 2:290. 1788 [1789]. — *Amellus asper* (Jacq.) Kuntze, Revis. gen. pl. 1:305. 1891. — *Melanthera aspera* (Jacq.) Steud. ex Small, Bull. Torrey Bot. Club 36:164. 1909. — TYPE: Jacquin, N. 1789. Icon. pl. rar. 3: t. 583 [fide Parks 1973].

Amellus asper (Jacq.) Kuntze var. *glabriusculus* Kuntze, Revis. gen. pl. 1:306. 1891. — *Melanthera aspera* (Jacq.) Small var. *glabriuscula* (Kuntze) Parks, Rhodora 75:194.

1973. — LECTOTYPE: (Parks 1973:194): Panama, Colón, *O. Kuntze s.n.* (NY).

Melanthera oxycarpa S. F. Blake, Contr. U.S. Natl. Herb. 22:628. 1924. — TYPE: Mexico, Veracruz, Zacuápan, C. A. Purpus 2437 (US; isotypes: F, MO, UC!).

Considerable additional synonymy may be found in Parks (1973).

ILLUSTRATION: Fig. 29.

Perennial herbs or suffrutesces, to 2 m high, sometimes clambering; petioles 1–7 cm long, sometimes very narrowly winged, leaf blades variable in shape, size, and texture, mostly deltate to ovate or narrowly triangular, sometimes pandurate, sometimes hastate, often attenuate, 5–10(2–15) cm long, 2–6(1–12) cm wide, margins crenate to coarsely serrate, both faces scabrous to hispid with some long and more short, erect, pointed hairs; heads 1–4 at ends of branches; peduncles 1–12+ cm long, ebracteate, strigose to hispid; involucre initially subhemispheric, becoming everted in fruit; phyllaries mostly 12–16, ovate to lanceolate or lance-linear, 4–7 mm long, proximally buffy to stramineous and chartaceous to cartilaginous, distally green and herbaceous, closely strigose; receptacles subspherical, 3–5+ mm high; paleae chartaceous to scarious, ovate to lance-linear or oblanceolate, 4–7 mm long in fruit, apices often purplish, hardened, pungent to aristate; ray florets none; disc florets 40–80(20–100+), corollas white, sometimes faintly purplish distally, contrasting with the blackish anthers, tubes 0.7–1.3 mm long, throats slightly ampliate, narrowly funnel-form, 2.9–3.6 mm long, lobes ca. 1 mm long; style branch appendages ca. 0.5 mm long; cypselae blackish, often with

buffy markings, stoutly obpyramidal, 3–4-angled to moderately flattened, ca. 2.5 mm long; pappi of 2–6, slender, hispidulous, fragile or caducous setae 1–2 mm long; $2n = 30$; flowering mostly Jul–Nov.

Wooded slopes or openings, often in disturbed places in Tropical Rain, Lower Montane Rain, Montane Rain, Evergreen Seasonal, Tropical Deciduous, Pine-Oak-Liquidambar, and Pine-Oak forests and in Mangrove Swamps; common in Northern Highlands, on Central Plateau, and in Central Depression, uncommon on Gulf Coastal Plain, in Eastern Highlands, in Sierra Madre, and on Pacific Coastal Plain; 3–900(–2050) m. Southern U.S. (La. to Fla.); southern Mex. (Tam., S.L.P., Jal., Cma., Mich., Pue., Ver., Gro., Oax., Tab., Camp., Yuc., Q. Roo, Chis.), through C.A.; Antill.; S.A. (Col., Ven., Ecu.). CHIAPAS COLLECTIONS: CASE 213 (TEX); C 49 (DS); F 3337 (DS, TEX); GL 466 (CAS); GS 205 (CAS); GE 1995 (CAS); GG 384 (CAS); Kim 10049 (TEX); Lan 814 (TEX); L 254 (DS); L 2675 (DS); Mz 7216 (TEX); Mz 8403 (TEX); Mz 11217 (TEX); Mz 14566 (TEX); Neff 93-4-18-4 (TEX); Och 3929 (CAS); Pa 876 (CAS); Pa 1766 (CAS); Pan 2126 (TEX); Prat 956 (CAS, TEX); SC 130 (CAS); SI 2166 (TEX); Sund 2403 (CAS); T 1184 (DS, LL); T 1868 (DS); T 1900 (DS, LL); T 3682 (DS); T 3824 (DS); We 17507 (DS); 6099; 8422; 8838; 9701; 10964; 13528; 13594; 14433; 14838; 19903; 20136; 20830; 26477; 28333; 28456; 28758; 33988; 40093; 40886; 41132; 41505; 41592; 41870; 42871; 45996; 46495; 46537; 46797; 46896; 48007; 54563; 57865.

43. MILLERIA

Milleria L., Sp. pl. 919. 1753. — TYPE: *Milleria quinqueflora* L.

Annuals, erect, to 1(–2) m high; nodes sometimes auriculate-appendaged; leaves opposite, petiolate, blades mostly deltate, 3–5-nerved from near their bases, margins serrate, faces sparsely pubescent, sometimes glabrate, the abaxial resin-gland-dotted; heads in congested to very open cymiform or paniculiform associations; peduncles very slender, bracteolate, stipitate-glandular; involucre obliquely campanulate to hemispheric, somewhat gibbous, 2–4 mm high; phyllaries 3–5+, the outer 2–3 green-herbaceous, basally connate, puberulent and stipitate-glandular, accrescent in fruit, the inner hyaline-scarious, ovate to lance-linear, free; receptacles convex; paleae hyaline-scarious, lanceolate to subulate, shorter than florets; ray florets solitary, pistillate, fertile, corollas yellow, tubes stout, glabrous, laminae cuneate to ovate, 3-lobed, abaxially gland-dotted; disc florets 3–8, functionally staminate, corollas metallic green, tubes stout, glabrous, throats longer, abruptly campanulate to funnelform, lobes 5, lance-ovate to deltate, throats and lobes gland-dotted; styles unbranched, astigmatic, distally hirtello-papillate; cypselae blackish, obovoid, obliquely attached, glabrous, striate, closely invested by cartilaginous involucre; pappi none; $x = 15$.

Two or 3 species; Mexico, Central America, Antilles, and South America.

REFERENCE: TURNER, B. L. and K. TRIPLETT 1996. Revisionary study of the genus *Milleria* (Asteraceae, Heliantheae). *Phytologia* 81:348–360.

1. *Milleria quinqueflora* L., Sp. pl. 919. 1753.

— TYPE: Grown in Uppsala, source unknown (LINN, 1031.1).

ILLUSTRATIONS: Fig. 30; Ann. Missouri Bot. Gard. 62:1060. 1975 [Fl. Pan.].

Herbs, to 1+ m high; petioles 1–6 cm long, narrowly winged, sometimes auriculate at base (or nodes auriculate-appendaged), leaf blades broadly deltate to ovate or rhombic, 4–15(–20) cm long, 3–15+ cm wide, bases cuneate to subcordate, margins

serrate, apices acute to attenuate, abaxial faces resin-gland-dotted and sparsely strigillose, sometimes glabrate, adaxial faces sparsely scabrellous; peduncles 2–12 mm long; ray corolla tubes 0.3–0.8 mm long, laminae 2.5–5 mm long; disc corolla tubes 0.8–1 mm long, throats 1.5–2 mm long, lobes ca. 0.5 mm long; “fruits” (involucre plus invested cypselae) greenish to brown or blackish, \pm ovoid, 4–6 mm long, rugose, cypselae proper 3.5–5 mm long; $2n = 30$; flowering Sep–Oct.

Ruderal, often in wet places, in Seasonal Evergreen and Tropical Deciduous forests; rare to uncommon in Central Depression and Sierra Madre and on Pacific Coastal Plain;

100–1450 m. Mex. (Son., Chih., Sin., Dgo., Nay., Jal., Qro., Cma., Mich., Méx., Mlos., Ver., Gro., Oax., Camp., Yuc., Chis.), through C.A.; Antill. (Cuba); northwestern S. A. (Col., Ven., Ecu.). CHIAPAS COLLECTIONS: *L* 1686 (DS); *Pa* 871 (CAS); *Sl* 2369 (TEX); *T* 3151 (DS); *X&S*-196 (DS); 13483; 20030; 28063; 28330; 37363; 40523; 46094.

44. MONTANOA

Montanoa Cerv. in P. La Llave and J. M. Lexarza, Nov. veg. descr. 2:11. 1825. — '*Montagnea*' DC., Prodr. 5:564. 1836, orth. var. — TYPE: *Montanoa tomentosa* Cerv.

Eriocoma Kunth, Nov. gen. sp., ed. fol. 4:210, t. 396. 1818 [1820]; ed. qto. 4:268. 1818, non *Eriocoma* Nutt. 1818. — *Eriocarpa* Cass. in F. Cuvier, Dict. sci. nat., ed. 2. 59:236. 1829, nom. superfl. — TYPE: *Eriocoma floribunda* Kunth. = *Montanoa tomentosa* Cerv. subsp. *tomentosa*

Uhdea Kunth, Ind. Sem. Hort. Berol. 13. 1847. — TYPE: *Uhdea bipinnatifida* Kunth. = *Montanoa bipinnatifida* (Kunth) K. Koch

Mostly shrubs or trees, rarely coarse, perennial herbs, 1–10(–20) m tall, sometimes scandent; leaves opposite, petioles canaliculate, sometimes winged or auriculate, blades usually 10–20+ cm long, mostly deltate or pentagonal to lance-ovate, commonly 3–5(–11)-lobed, 3–5-nerved from near their bases; heads (1–)12–300+ in compact to open, corymbiform associations to 25+ cm across; peduncles stout to slender, usually pilose to hirsute; involucre hemispheric to saucer-shaped; phyllaries 3–7(–22) in 1(–3) series, mostly lance-ovate to linear, 2–5(–30+) mm long, often becoming reflexed; receptacles mostly ovoid to hemispheric; paleae at anthesis rotund to obtrullate, pentagonal, or lance-attenuate, conduplicate, usually with an indurate cusp, in fruit mostly much enlarged, each infolding the subtended cypselae and either inflated, papery, and net-veined or cartilaginous and parallel-nerved; ray florets none or 5–15 (to ca. 50+ in some cultivars), neuter, corollas mostly white, sometimes creamy white, greenish, purplish, or yellowish, tubes stout, glabrous or pubescent, laminae spatulate to lance-elliptic, usually pilosulous and gland-dotted abaxially; disc florets 3–160, bisexual, fertile, corollas ochroleucous to yellow, sometimes greenish or blackish, tubes cylindric or basally dilated, typically 1/3–1 times as long as the abruptly ampliate, cylindric to cylindro-campanulate throats, lobes 5, broadly to narrowly deltate, glabrous or some or all with abaxial surfaces pilosulous and/or glandular-puberulent; anthers yellow to brown or blackish, often gland-dotted abaxially; style branches with deltate to subulate-attenuate or penicillate, hispidulous appendages; cypselae dull to shiny reddish to grayish or blackish brown, weakly laterally compressed and somewhat quadrangular in cross section, often asymmetrically obpyramidal, obliquely inserted on receptacles, glabrous or very sparsely hairy, smooth to striate or minutely rugulose; pappi none, cypselae each sometimes crowned with a minute annulus; $x = 19$.

About 25 species, predominately Mexican, extending through Central America into South America; sporadically adventive elsewhere as escapes from cultivation.

REFERENCE: FUNK, V. A. 1982. The systematics of *Montanoa* (Asteraceae, Heliantheae). Mem. New York Bot. Gard. 36:1–133.

- a. Heads (80–)150–300+ in dense masses 12–18 cm across; peduncles 3–8(–12) mm long; ray florets none or 3–5, corolla laminae 3–6(–10) mm long; disc florets 10(3–17) 9. *M. tomentosa*
- aa. Heads mostly 3–100(–150) in open associations 8–30 cm across; peduncles mostly 1–10 cm long; ray florets 5–15, corolla laminae 10–30 mm long; disc florets 30–150.
 - b. Paleae mostly 4–10 mm long at anthesis, conduplicate less than 1/2 of length, parallel-nerved, attenuate-pungent, becoming cartilaginous in fruit.
 - c. Petioles and peduncles shaggy-hirsute; heads mostly 3–5; phyllaries (9–)12–30 mm long; ray laminae 9–12(–16) mm long 2. *M. echinacea*
 - cc. Petioles and peduncles puberulent; heads mostly 15–30; phyllaries 5–6 mm long; ray laminae 18–22 mm long 8. *M. standleyi*
 - bb. Paleae mostly 2.5–4 mm long at anthesis, conduplicate ca. 2/3+ of length, reticulate-veined, abruptly apiculate, becoming papery in fruit.
 - d. Petioles winged to base.
 - e. Heads mostly 30–60 per capitulescence; peduncles 1–3(–4) cm long; phyllaries 3–4(–5) mm long; ray florets mostly 5–8, laminae mostly 12–18 mm long 6. *M. pteropoda*
 - ee. Heads borne singly or 3–5 per capitulescence; peduncles 4–10 cm long; phyllaries 7–12(–20) mm long; ray florets 10–12(–50+), laminae 15–30+ mm long 7. *M. speciosa*
 - dd. Petioles wingless or nearly so.
 - f. Phyllaries 10–14; disc florets 30–60; disc corollas proximally glabrous 5. *M. leucantha*
 - ff. Phyllaries 5–7; disc florets 50–120; disc corollas hispidulous and glandular-puberulent throughout.
 - g. Leaf blades typically deeply 3–5(–11)-lobed, 15–20(–40) cm long, each with 2, free auricles at insertion of petiole; ovaries with fleshy coronas at anthesis 4. *M. hibiscifolia*

- gg. Leaf blades shallowly, if at all, lobed, 5–15(–20) cm long, obscurely, if at all, auriculate; ovaries without fleshy coronas at anthesis.
- h. Heads mostly 60–150 per capitulescence; ray corolla laminae mostly 12–18 mm long; disc florets 50–80+, corollas ca. 3.7–4 mm long 3. *M. hexagona*
- hh. Heads mostly 12–20 per capitulescence; ray corolla laminae mostly 15–25 mm long; disc florets mostly 80–120, corollas ca. 2 mm long 1. *M. atriplicifolia*

1. *Montanoa atriplicifolia* (Pers.) Schultze Bip. in B. C. Seemann, Bot. voy. Herald 304. 1856, 'Montagnaea.'

— *Verbesina atriplicifolia* Pers., Syn. pl. 2:472. 1807 [cf. Juss. & Desf. in L. A. Colla, Hortus ripul. 144, t. 31. 1824.]. — *Eriocoma atriplicifolia* (Pers.) Kuntze, Revis. gen. pl. 1:336. 1891. — TYPE: "Hort. Ital.," origin unknown (P?; isotype: FI).

Montanoa dumicola Klatt, Bull. Soc. Roy. Bot. Belgique 31:200. 1892. — TYPE: Costa Rica, San José, "llanos de Alajuelita," 1100 m, 1 Dec 1889, *H. Pittier 1454* (GH; isotypes: BR, G, US).

Montanoa pauciflora Klatt, Leopoldina 23:90. 1887. — *Coreopsis trilobata* Vahl ex Klatt, pro syn., loc. cit. — TYPE: "America meridional: e pl. West," (not located).

Montanoa schottii B. L. Rob. & Greenm., Proc. Amer. Acad. Arts 34:518. 1899. — TYPE: Mexico, Yucatán, between Mérida and Sisal, 24 Oct 1865, *A. Schott 913* (F).

For additional synonymy, see Funk (1982).

ILLUSTRATION: none found.

Shrubs, 15–30 dm tall, or scandent plants with stems to 15 m long; petioles 2–4(–12) cm long, very slender, sometimes auriculate-winged distally, leaf blades deltate to ovate or pentagonal, sometimes 3-lobed, often 3-nerved from their bases, 5–8(–15) cm long, 4–6(–15) cm wide, bases truncate, margins serrate or entire, apices somewhat acuminate, abaxial faces strigilloso-scabrellous and minutely gland-dotted, adaxial faces scabrellous; heads mostly 12–20 in ovoid, leafy, paniculiform associations 8–12(–15) cm across; peduncles 1–3(–8) cm long, pilose, often becoming coiled in fruit; involucre saucer-shaped or with phyllaries reflexed, 6–10 mm diam.; phyllaries 5–7, lanceolate to lance-ovate, 3–5 mm long, strigilloso-hispidulous; paleae at anthesis greenish, broadly lanceolate, abruptly acuminate-pungent, ca. 2.5 mm long, sparsely strigilloso-hispidulous, in fruit stramineous to purplish, papery, inflated, 7–8(–14) mm long, the cusp slightly hooked; ray florets 7–9(–15), corollas creamy white, tubes ca. 0.5 mm long, laminae spatulate to obovate, mostly 15–25 mm long; disc florets mostly 80–120, corollas greenish ochroleucous to yellow, minutely hispidulous and glandular-puberulent, tubes ca. 0.5 mm long, throats ca. 1 mm long, lobes deltate, ca. 0.5 mm long; style branches ca. 0.8 mm long, apically deltate-hispidulous; cypselae dull reddish brown, ca. 2.5 mm long, striate, wholly glabrous or very sparsely hairy at their summits; $2n = 38$; flowering Nov–Feb.

Steep slopes and open places in Tropical Rain, Lower Montane Rain, and Evergreen Cloud forests; rare or uncommon in Eastern Highlands and in Sierra Madre; 280–2250 m. Southeastern Mex. (Tab., Yuc., Q. Roo, Chis.), Guat., Bel., Hond., Salv., Nic., C.R. CHIAPAS COLLECTIONS: *EM 18603* (F, MEXU); *Prat 1125* (TEX); *So 1589* (MICH, US); 42607; 55724; 57844; 58463.

2. *Montanoa echinacea* S. F. Blake, Brittonia 2:345. 1937.

— TYPE: Guatemala, Huehuetenango, above Chiantla, 3050 m, 16 Sep 1934, *A. F. Skutch 1276* (A; isotypes: P, LL, NY, US).

ILLUSTRATION: none found.

Shrubs, to 4 m high; petioles (2–)4–7 cm long, shaggy-hirsute and glandular-pubescent, leaf blades ovate to deltate-cordate, 3-nerved from near their bases, 8–15 cm long, 1–12 cm wide, bases cordate, margins serrate, apices attenuate, abaxial faces pilose and glandular-puberulent, adaxial faces scabrellous and glandular-puberulent; heads mostly 3–5 in corymbiform clusters 8–12 cm across; peduncles stout, mostly 2–4(–11) cm long, densely piloso-hirsute and glandular-puberulent; involucre saucer-shaped; phyllaries 5–8(–12), lance-linear, mostly (9–)12–30 mm long, piloso-hirsute and glandular-puberulent; paleae at anthesis greenish-stramineous, lance-attenuate, (6–)8–10 mm long, pilose and glandular-puberulent, in fruit dully stramineous, cartilaginous, (15–)18–25 mm long, apically subulate-indurate; ray florets 10–12+, corollas white to pale purplish, tubes ca. 1 mm long, laminae obovate, 9–12(–16) mm long; disc florets 50–80, corollas yellowish, tubes 1–1.5(–2) mm long, sparsely pilose and glandular-puberulent, throats ca. 4.5 mm long, proximally glabrous, distally hispidulous, lobes narrowly deltate, ca. 1 mm long, hispidulous; style branches ca. 2 mm long, hispidulous with subulate appendages; cypselae reddish or grayish brown, 4–5 mm long, minutely striate; flowering Sep–Nov.

Shaded ravines in Tropical Deciduous Forest; very local at lower edge of Central Plateau; 1600–1900 m. Southern Mex. (Oax., Chis.), Guat. CHIAPAS COLLECTIONS: *GL 188* (CAS, TEX); *GL 264* (CAS); *L 1930* (DS); *Lo 139* (CAS, TEX); *Lo 216* (CAS); 29677.

3. *Montanoa hexagona* B. L. Rob. & Greenm., Proc. Amer. Acad. Arts 34: 514. 1899.

— TYPE: Mexico, Chiapas, Oct 1864–1870, *A. B. Ghiesbreght s.n.* [535] (GH; isotypes: BM, K, LE, MO, NY).

ILLUSTRATION: none found.

Trees or shrubs, to 10(–20) m tall; petioles 4–6(–17) cm long, bruneus-pilose, leaf blades mostly rounded-deltate to pentagonal, sometimes 3-lobed, 3–5-nerved from above their bases, mostly 8–20 cm long and wide, bases cuneate to truncate or obscurely cordate, sometimes sub-auriculate at insertion of petiole, margins coarsely serrate, apices acute to acuminate, abaxial faces sparsely strigilloso to densely piloso-tomentose, usually also minutely gland-dotted, adaxial faces strigilloso to scabrellous; heads mostly 60–150 in open, paniculiform associations 15–30+ cm across; peduncles 1–3(–5) cm long,

densely pilose, becoming recurved in fruit; involucre mostly saucer-shaped, 8–12 mm diam.; phyllaries 5–7, lance-ovate, 3–5 mm long, pilose; paleae at anthesis pale to dark gray-green, broadly ovate to rotund, ca. 4 mm long, abruptly cuspidate, medially and marginally pilosulous, faces gland-dotted, in fruit stramineous, papery, inflated, 12–17 mm long; ray florets 5–7(–10), corollas white to creamy white, tubes stout, ca. 1 mm long, laminae narrowly obovate to spatulate, 12–15 mm long; disc florets 50–80+, corollas greenish yellow, sometimes darkened distally, evenly hispidulous and glandular-puberulent, tubes ca. 1 mm long, throats 1.5–2 mm long, lobes narrowly deltate, ca. 1.2 mm long; style branches ca. 1.8 mm long, abruptly dilated distally, blackish, hispidulous-penicillate; cypselae dull beige to brown, 2.5–4 mm long, minutely rugulose; $2n = \text{ca. } 152$; flowering Nov–Dec.

Wooded slopes in Evergreen Cloud, Pine-Oak-Liquidambar, and Pine-Oak forests; common on Central Plateau, uncommon in Sierra Madre; 1350–2800 m. Southern Mex. (Chis.), Guat. CHIAPAS COLLECTIONS: *And 4247* (CAS); *Funk 2565* (OS); *Funk 2662* (OS); *HL 449* (CAS); *L 656* (DS); *EM 1549* (MEXU, MICH, US); *Pan 1801* (TEX); *SR 333* (CAS, TEX); *T 144* (DS); *T 391A* (TEX); *T 458* (TEX); *T 575* (LL); *T 1324* (DS, LL); *T 1348* (DS); *T 1715* (DS); *T 1761* (DS, LL); *7415*; *7863*; *47772*; *48856*; *55794*.

4. *Montanoa hibiscifolia* Benth., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 4:89. 1852, '*Montagnaea*.'

— *Eriocoma hibiscifolia* (Benth.) Kuntze, Revis. gen. pl. 1:336. 1891. — LECTOTYPE (Funk 1982:101): Nicaragua, Prov. Nueva Segovia, 1845–1848, *A. S. Oersted 235* [9051] (K; isolectotype: C).

Montanoa samalensis J. M. Coult., Bot. Gaz. 20:49. 1895. — TYPE: Guatemala, Retalhuleu, Río Samala, 1700 ft. [518 m], Apr 1892, *J. Donnell Smith 2858* (F; isotypes: G-BOIS, K, US).

Montanoa pittieri B. L. Rob. & Greenm., Proc. Amer. Acad. Arts 34:517. 1899. — TYPE: Costa Rica, San José, "lano de Alajuelita," 1 Dec 1889, *H. Pittier 1455* (GH; isotypes: BR, G).

Montanoa wercklei Berger, Gard. Chron. 50:122. 1911. — TYPE: Grown in Italy (Horto Mortolensi) from Costa Rican seed sent by C. Werckle (K; isotype: G).

ILLUSTRATION: Ann. Missouri Bot. Gard. 62:1121. 1975 [Fl. Pan.].

Shrubs or trees, 3–6 m tall; petioles 4–7 cm long, shaggy-pilose, at least proximally, leaf blades roughly ovate to pentagonal in outline, mostly 3–5(–11)-lobed, 3-nerved from at or just above their bases, 12–20(–40) cm long, 8–12(–30) cm wide, bases broadly cuneate to cordate, usually with 2, lance-ovate auricles 3–6 mm long at insertions of petioles, margins serrate to coarsely toothed or subentire, apices acute to acuminate, abaxial faces pilose with crisped hairs and gland-dotted, adaxial faces strigillose; heads 30–60 in open, corymbiform associations 8–25 cm across; peduncles 2–4(–6) cm long, densely pilose; involucre mostly saucer-shaped, ca. 6–10 mm diam.; phyllaries 5–7, lanceolate, 3–5 mm long, mucronate, pilose; paleae at anthesis pale to dark gray-green, broadly ovate to rotund, ca. 3 mm long, abruptly cuspidate, medially and marginally pilosulous, faces glabrous or gland-dotted, in fruit each

falling with included cypselae, papery, inflated, 9–15 mm long; ray florets mostly 8, corollas white or creamy white to ochroleucous, tubes stout, ca. 0.5 mm long, glabrous or pilosulous, laminae obovate to spatulate, mostly 12–15 mm long; disc florets 50–100, corollas greenish yellow, evenly papillate-hispidulous and glandular-puberulent, tubes ca. 0.5 mm long, throats ca. 1.5 mm long, lobes deltate, 0.8 mm long; style branches ca. 1.2 mm long, abruptly hispidulous-penicillate; cypselae reddish or dark brown, 2–3 mm long, minutely rugulose; immature ovaries beset with a 5-toothed, fleshy (glandular?, elaiosomic?) crown 0.3–0.5 mm high; $2n = 38$; flowering Oct–Dec.

Canyons and slopes in Tropical Deciduous and Pine-Oak forests; uncommon on Central Plateau and in Sierra Madre; 950–1700 m. Southern Mex. (Chis.), Guat., Hond., Salv., Nic., C.R. CHIAPAS COLLECTIONS: *Calz 3741* (TEX); *EM 723* (MEXU, MICH, MO, NA, US); *PG 133* (CAS); *SC 302* (CAS, TEX); *Ve 878* (TEX); *7662*; *46314*.

5. *Montanoa leucantha* (Lag.) S. F. Blake, Contr. U.S. Natl. Herb. 26: 245. 1930.

— *Rudbeckia leucantha* Lag., Gen. sp. pl. 32. 1816. — LECTOTYPE (Funk 1982, p. 88): Grown in Madrid from Mexican seed sent by M. Sessé (MA).

All Chiapan collections of this species are referable to:

5a. *Montanoa leucantha* (Lag.) S. F. Blake subsp. *arborescens* (DC.) V. A. Funk

— *Montanoa arborescens* DC., Prodr. 5:565. 1836, '*Montagnaea*.' — LECTOTYPE (Funk 1982:89): Mexico, "Cordilliere de Guchilaque," Aug 1827, *J. L. Berlandier 1006* (G-DC, microfiche!; isolectotypes: FI, G, P).

Montagnea clematidea Walp., Linnaea 14:308. 1840. — *Eriocoma clematidea* (Walp.) Kuntze, Revis. gen. pl. 1:336. 1891. — TYPE: Mexico, *W. F. Karwinski s.n.* (LE ?; isotype: KIEL).

Montanoa uncinata Schultz-Bip. in K. Koch, Wochenschr. Verienes Beförd. Gartenbaues Königl. Preuss. Staaten 7:406. 1864. — *Eriocoma uncinata* (Schultz-Bip.) Kuntze, Revis. gen. pl. 1:336. 1891. — TYPE: Mexico, Cumbre de Estepa, Sep 1842, *F. M. Liebmam 484* [Pl. Mex. 9056] (P; isotypes: C, G, K, P).

Montanoa patens A. Gray, Proc. Amer. Acad. Arts 21:388. 1886. — TYPE: Mexico, Chihuahua, mountains above Batopilas, Aug–Nov 1885, *E. Palmer s.n.* [164] (GH; isotypes: BM, G, GH, K, LE, NY).

Polymnia nervata M. E. Jones, Contr. W. Bot. 12:44. 1908. — LECTOTYPE (Funk 1982:89): Mexico, Chihuahua, Sierra Madre, Guayanopa Canyon, 3600 ft. [1098 m], 24 Sep 1903, *M. E. Jones s.n.* (POM; isolectotype: POM).

ILLUSTRATION: none found.

Shrubs, to 7 m tall; petioles 3–8(–12) cm long, slender, leaf blades rhombic-ovate to deltate or pentagonal, sometimes 3–5-lobed, 3-nerved from above their bases, 8–16(–24) cm long, 4–12(–24) cm wide, bases often cuneate-decurrent on the petiole, otherwise broadly cuneate to truncate, margins subentire to remotely serrate, apices acute to attenuate, abaxial faces strigil-

lose to pilose and gland-dotted, (canescent when young), adaxial faces scabrellous; heads 40–80(–100+) in open, corymbiform associations 12–20 cm across; peduncles 1–4 cm long, pilose; involucre saucer-shaped or with phyllaries soon reflexed, ca. 6–10+ mm diam.; phyllaries 10–14 in 2 series, the outer longer, lanceolate to lance-ovate, 3–6 mm long, apically pungent, densely pilose, the inner intergrading with outer paleae; paleae at anthesis greenish, broadly lanceolate, ca. 4 mm long, abruptly acuminate-pungent, subglabrous, in fruit stramineous, papery, inflated, 12(8–15) mm long, cusp slightly reflexed; ray florets 5–8, corollas creamy white, tubes ca. 1 mm long, laminae obovate to elliptic, 12–18 mm long; disc florets 30–60, corollas greenish yellow to yellow, tubes ca. 1 mm long, basally dilated, glabrous, throats ca. 2 mm long, proximally glabrous, the distal throat and the narrowly deltate lobes (0.5 mm long) minutely hispidulous and glandular-pubescent; style branches ca. 1 mm long, hispidulous-penicillate; cypselae dull reddish to purplish brown, 2.5–3 mm long, smooth; $2n = 38$; flowering Oct–Dec.

Open slopes in Pine-Oak and Pine-Oak-*Liquidambar* forests; common in Northern Highlands and on adjacent Central Plateau, uncommon in Central Depression and N foothills of Sierra Madre; 1000–1850 m. Western and southern Mex. (Son., Chih., Sin., Dgo., Jal., Hgo., Mich., Méx., D.F., Mlos., Pue., Oax., Chis.). CHIAPAS COLLECTIONS: *And* 4240 (CAS); *And* 4248 (MICH, OS); *And* 4253 (CAS); *And* 4256 (CAS); *Funk* 2561 (OS, TEX); *Funk* 2571 (OS, TEX); *Funk* 2574 (OS); *Funk* 2576 (OS); *Funk* 2693 (OS); *Funk* 2695 (OS); *Funk* 2699 (OS); *Funk* 2700 (OS); *GL* 190 (CAS, TEX); *Lo* 151 (CAS, TEX); *T* 9396 (CAS, TEX); *T* 9532 (TEX); 7930; 14053; 21746; 22913; 30243; 46788; 47015; 60246.

6. *Montanoa pteropoda* S. F. Blake, Proc. Biol. Soc. Wash. 37:56. 1924.

— TYPE: Guatemala, Huehuetenango, between San Martín and Todos Santos, 2135–2590 m, 25 Dec 1895, E. W. Nelson 3616 (US).

ILLUSTRATION: none found.

Sprawling shrubs (or vines), to 5 m tall (or long); petioles 3–6 cm long, winged, 12–20 mm wide, usually auriculate, sometimes connate-perfoliate, leaf blades deltate to pentagonal, 3–5-nerved from near their bases, 10–18+ cm long, 5–12+ cm wide, bases truncate to broadly cuneate, margins remotely serrate to subentire, apices attenuate, abaxial faces strigillose and minutely gland-dotted, adaxial faces scabrellous; heads mostly 30–60 in corymbiform associations 15–30 cm across; peduncles 1–3(–4) cm long, pilose, recurved in fruit; involucre saucer-shaped, mostly 5–7 mm diam., phyllaries 5–7, lance-ovate, 3–4(–5) mm long, pilose; paleae at anthesis greenish, darker distally, pentagonal, 3–4 mm long, abruptly acuminate-pungent, medially pilosulous, ciliolate, in fruit dully stramineous to purplish, papery, inflated, 8–14 mm long, the cusp inflexed; ray florets mostly 5–8, corollas white, sometimes greenish distally, tubes ca. 1 mm long, laminae narrowly spatulate to oblanceolate, mostly 12–18 mm long; disc florets mostly 40–80(–100+), corollas yellow to ochroleucous, distally dark green to blackish, hispidulous and glandular-puberulent, at least distally, tubes 0.5–0.7 mm long, throats 1–1.5 mm long, lobes lance-ovate, ca. 1 mm long; style branches ca. 1 mm long, distally deltate-

hispidulous; cypselae dull dun to reddish brown, 2.5–3.5 mm long, minutely striate; $2n = 38$; flowering Sep–Jan.

Montane Rain, Evergreen Cloud, and Pine-Oak forests; locally common on Central Plateau and in Sierra Madre; 1350–2800 m. Southern Mex. (Chis.), Guat. CHIAPAS COLLECTIONS: *And* 4245 (CAS, MICH, OS); *Crq* 10472 (NY); *Funk* 2564 (OS, TEX); *Funk* 2569 (OS); *Funk* 2570 (OS, TEX); *Funk* 2697 (OS); *L* 2717 (DS); *L* 2941 (DS); *Sl* 3130 (TEX); 7346; 22835; 31902; 40392; 41120; 41641; 42732; 46219; 53793; 55726; 55799; 55919; 66020.

7. *Montanoa speciosa* DC., Prodr. 5:565. 1836, 'Montagnaea.'

— TYPE: Mexico, "ad Cuernavaca," 20 Oct 1827, J. L. Berlandier 1057 (G-DC, microfiche!; isotypes: GH, KIEL, MICH, W).

ILLUSTRATION: none found.

Shrubs, 1–4 m tall; petioles 2–12 cm long, winged, 5–25+ mm wide, margins serrate to undulate, basally auriculate, leaf blades pentagonal to lance-ovate in overall outline, commonly 3–7-lobed, 3-nerved from near their bases, 6–18 cm long, 3–18 cm wide, bases broadly cuneate to truncate or cordate, margins subentire or remotely serrate, apices attenuate, abaxial faces pilosulous to velutinous or submentose and glandular-puberulent, adaxial faces scabrellous; heads (1–)3–5+ in loose aggregations; peduncles 4–10 cm long, pilose and glandular-pubescent; involucre saucer-shaped; phyllaries 9–16(–22) in 2–3 series, linear, 7–12(–20) mm long, densely pilosericaceous and glandular-pubescent; paleae at anthesis stramineous, pentagonal to rotund, ca. 3 mm long, abruptly apiculate, pilosulous and glandular-puberulent, in fruit stramineous to purplish, papery, inflated, (8–)15–17 mm long; ray florets 10–12(–50+ in cultivars), corollas white (to yellowish), tubes ca. 1 mm long, laminae spatulate to obovate or elliptic (to sub tubular in cultivars), 15–30+ mm long; disc florets ca. 150 (often far fewer in cultivars), corollas yellow, pilosulous and glandular-puberulent, tubes ca. 1.5 mm long, throats only slightly dilated, cylindric, 4–5 mm long, lobes narrowly deltate, ca. 1 mm long; style branches ca. 1.8 mm long with hispidulous, deltoid to penicillate appendages; cypselae brown, ca. 3.5 mm long, sparsely hairy distally or glabrous; $2n = 38$; flowering sporadically Jun–Jan.

In Chiapas, known only as cultivated plants or ruderals; to be expected throughout the state. Native in Tropical Deciduous and Pine-Oak forest habitats in Mich., Méx., Mlos., Pue., Gro., and Oax. at 140–1100 m. CHIAPAS COLLECTIONS: *Calz* 3770 (TEX); *L* 2026 (DS); *EM* 17963 (DS); *T* 2900 (DS); *T* 4540 (CAS); 23651; 23828.

8. *Montanoa standleyi* V. A. Funk, Mem. New York Bot. Gard. 36:57. 1982.

— TYPE: Mexico, Chiapas, Mt. Ovando, 2300 m, 14–18 Nov 1939, E. Maruda 3939 (MEXU; isotypes: A, F, MICH, MO, NY, TEX, US).

ILLUSTRATION: Mem. New York Bot. Gard. 36:58. 1982.

Shrubs, to 4 m tall; petioles 2–7 cm long, puberulent, leaf blades ovate-lanceolate to pentagonal, 3-nerved from near their bases, 7–12 cm long, 4–10 cm wide, bases cuneate to subtrun-

cate, margins serrate, apices acute to attenuate, abaxial faces glabrous or nearly so, adaxial faces scabrellous; heads mostly 15–30 in ovoid paniculiform associations ca. 15 cm across; peduncles 1–4 cm long, puberulent; involucre saucer-shaped, 10–12 mm diam.; phyllaries mostly 5, lanceolate, 5–6 mm long, glabrous, soon reflexed; paleae at anthesis, stramineous and greenish, basally ovate, apically attenuate-pungent, ca. 4 mm long, ciliolate, otherwise glabrous, in fruit persistent, stramineous, cartilaginous, 8+ mm long, the attenuate cusp indurate, recurved; ray florets 5–10, corollas white, tubes very short, laminae narrowly spatulate or obovate, 18–22 mm long; disc florets 35–50+, corollas yellowish, glabrous, tubes ca. 1 mm long, throats 3–3.5 mm long, lobes narrowly deltate, 1–1.5 mm long; style branches ca. 1.5 mm long, distally attenuate-hispidulous; cypselae dark brown, ca. 2.5 mm long; flowering Dec–Apr.

Associations unknown; rare in Sierra Madre; 1550 m. Southern Mex. (Oax., Chis.). CHIAPAS COLLECTIONS: *Calz 8901* (TEX); *EM 749* (MICH); *EM 2235* (MICH); *HX&S 362* (MEXU).

9. *Montanoa tomentosa* Cerv. in P. La Llave and J. M. Lexarza, Nov. veg. descr. 2:11. 1825.

— NEOTYPE (Funk 1982:42): Mexico, Distrito Federal, W of Avenue Insurgentes, S of Univ. Nacional Autónoma de México, 3 Sep 1976, *R. L. Hartman and V. A. Funk 4225* (OS; isoneotypes: K, MA, MEXU, MO, NY, TEX, UC, US).

All Chiapan collections of this species are referable to:

9a. *Montanoa tomentosa* Cerv. subsp. *xanthiifolia* (Schultz-Bip.) V. A. Funk, Mem. New York Bot. Gard. 36:45. 1982.

— *Montanoa xanthiifolia* Schultz-Bip. in K. Koch, Wochenschr. Verienes Beförd. Gartenbaues Königl. Preuss. Staaten 7:406. 1864. — *Eriocoma xanthiifolia* (Schultz-Bip.) Kuntze, Revis. gen. pl. 1:336. 1891. — TYPE: Mexico, Chacalpa, *F. M. Liebmans 265* [Pl. Mex. 9057] (P; isotypes: C, K).

Montanoa triloba Schultz-Bip. in K. Koch, Wochenschr. Beförd. Gartenbaues Königl. Preuss. Staaten 7:406. 1864. — *Eriocoma triloba* (Schultz-Bip.) Kuntze, Revis. gen. pl. 1:336. 1891. — TYPE: Mexico, 18 Dec 1863, *C. de Berges 123* (P).

Eriocoma hemsleyana Kuntze, Revis. gen. pl. 1:336. 1891. — *Montanoa anomala* B. L. Rob. & Greenm., Proc. Amer. Acad. Arts 34:509. 1899, nom. superfl. — *Montanoa hemsleyana* (Kuntze) S. F. Blake, Contr. U.S. Natl. Herb. 23:1530. 1926. — TYPE: Mexico, Veracruz, valley of Córdoba, near “la Piñuela,” 6 Mar 1866, *E. Bourgeau 2057* (K; isotypes: G, GH, L, LL, MPU, P).

Montanoa palmeri Fern., Proc. Amer. Acad. Arts 33:93. 1897. — TYPE: Mexico, Guerrero, near Acapulco, Nov 1894, *E.*

Palmer s.n. [44] (GH; isotypes: BM, F, GH, K, MA, MO, NY, UC!, US).

Montanoa seleriana B. L. Rob. & Greenm., Proc. Amer. Acad. Arts 34: 510. 1899. — TYPE: Mexico, Chiapas, Tuxtla Gutiérrez, 19 Feb 1896, *C. Seler and E. Seler 1965* (GH).

Montanoa myriocephala B. L. Rob. & Greenm., Proc. Amer. Acad. Arts 34: 511. 1899. — TYPE: Mexico, Jalisco, Chapala, Oct–Nov 1886, *E. Palmer s.n.* [714] (GH; isotypes: BM, G, K, LE, MO, NDG, P, US).

Montanoa reko S. F. Blake, Contr. U.S. Natl. Herb. 22:610. — TYPE: Mexico, Oaxaca, Apango, 450 m, 11 Oct 1917, *B. P. Reko 3534* (US; isotype: US).

Montanoa subglabra S. F. Blake, Contr. U.S. Natl. Herb. 22:610. 1924. — TYPE: Guatemala, near Neuton, 915–1220 m, 13–15 Dec 1895, *E. W. Nelson 3536* (US; isotype: F).

ILLUSTRATION: none found.

Shrubs or trees, 2–8+ m tall; petioles 1–4 cm long, glabrous or pilose, leaf blades narrowly rhombic to ovate, sometimes obscurely polygonal or 3–5-lobed, 3-nerved from above their bases, 5–15 cm long, 2–10 cm wide, bases narrowly to broadly cuneate, margins subentire to serrate, apices attenuate, abaxial faces pilose to strigillose or glabrous, usually gland-dotted, adaxial faces scabrellous; heads (80–)150–300+ in dense, paniculiform masses (8–)12–18+ cm across, sometimes fewer in smaller aggregations; peduncles mostly 3–8(–12) mm long, densely pilose; involucre obconic, 2.5–5 mm high; phyllaries 4–7, lanceolate to lance-ovate, acute, pilose and, often, gland-dotted; paleae at anthesis lance-ovate to lance-subulate and pungent, 3–6 mm long, densely pilose with hairs 2–3+ mm long, in fruit to ca. 10 mm long; ray florets none or 3–5, corollas white, tubes very slender, 1.5 mm long, laminae narrowly to broadly ovate or obovate, 3–6(–10) mm long; disc florets 10(3–17), corollas ochroleucous to yellow, tubes ca. 1.5 mm long, glabrous, throats 1–1.5 mm long, gland-dotted, lobes narrowly deltate, ca. 0.8 mm long, hispidulous and gland-dotted; style branches 1–1.5 mm long, distally hispidulous, abruptly conical-penicillate; cypselae pale to dark brown, shiny, 1.5–2.5 mm long; $2n = 38$; flowering Oct–Feb.

Evergreen Seasonal, Tropical Deciduous, Pine-Oak-Liquidambar, Pine-Oak, and Thorn forests; common in Central Depression, uncommon in adjacent Northern Highlands, on Central Plateau, in Sierra Madre, and on Pacific Coastal Plain; 560–1370 m. Southern Mex. (S.L.P., Jal., Qro., Hgo., Mich., Pue., Ver., Gro., Oax., Chis.), Guat., Hond., Salv., Nic., C.R. CHIAPAS COLLECTIONS: *And 4209* (CAS); *And 5551* (DUKE, ENCB, MICH, MO); *Crq 9666* (GH, MEXU, MICH, MSC, NY, SMU, TEX, US); *Crq 10484* (ENCB, MEXU, NY); *DD 383* (DS); *Funk 2551b* (OS); *Funk 2553* (OS); *Lan 751* (TEX); *Lan 760* (TEX); *L 3011* (DS); *EM 1889* (F, GH, LL, MICH, MO, NA, NY, US); *EM 16247* (MEXU, MO, US); *Pa 189* (CAS); *Per 3043* (DS); *P 10210* (UC); *SI 2163* (TEX); *T 7476* (TEX); *9100*; *13711*; *23058*; *23414*; *23581*; *23937*; *28295*; *30244*; *30249*; *30308*; *30538*; *41786*; *42165*; *47587*; *47943*; *48926*; *48978*; *49079*; *54154*; *56261*; *56308*; *57019*; *70942*.

45. NEUROLAENA

Neurolaena R. Br., Trans. Linn. Soc. London 12:120. 1817 [1818] [Observ. comp.] = *Neurochlaena* Less., Synop. Comp. 388. 1832, orth. var. — TYPE: *Conyza lobata* L. = *Neurolaena lobata* (L.) Cass.

Annuals, to 2+ m high, or suffrutices, shrubs, or trees, to 3(–5) m high; young stems often strongly striate-grooved and pilosulous to shaggy-villous; leaves alternate, subsessile or with \pm winged petioles, the blades narrowly lanceolate to ovate or trullate, sometimes with 2(–4+) lateral lobes (rarely the lobes again divided), blades commonly 10–30 cm long, margins entire or toothed, abaxial faces usually dotted with resin globules and variously pilosulous to villosulous (or merely closely scabrellous on nerves), adaxial faces scabrellous to nearly glabrous; heads usually 20–150+ in corymbiform or paniculiform aggregations; peduncles slender, bracteolate, usually hispidulous to puberulous; involucre cylindro-campanulate to hemispheric, mostly 5–10 mm high; phyllaries 20–40, usually narrow and strongly graduate in 3–5 series, the outer usually herbaceous and much shorter than the more membranous or scarious inner ones; receptacles slightly convex to hemispheric; paleae similar to inner phyllaries, weakly persistent or deciduous; ray florets none or ca. 8, pistillate, fertile, corollas yellow, tubes very slender, laminae oval-elliptic, about as long as tubes, weakly 3-lobed; disc florets 12–60(–100), bisexual, fertile, corollas greenish yellow or yellow (to orange?), often turning brown, tubes slender, about equal to the cylindric or narrowly funnelform throats, lobes 5, ovate-deltate to lance-ovate, sometimes abaxially scabrellous or dotted with resin globules; style branches slender, minutely hispidulous, stigmatic almost to the abruptly penicillate tips; cypselae blackish (minutely mottled), obovoid to obpyramidal with conspicuous, stramineous carpodia, the cypselae bodies glabrous or distally sparsely pubescent, often contracted distally; pappi of 30–40, white to sordid, unequal to subequal bristles in 1(–2) series; $x = 11$.

Ten (or fewer) species of Neotropics, centered in southern Mexico.

REFERENCE: TURNER, B. L. 1982. Taxonomy of *Neurolaena* (Asteraceae – Heliantheae). Pl. Syst. Evol. 140:119–139.

- a. Leaf-blade length of main-stem leaves mostly 8–12(–20) times width, seldom any blades lobed; heads radiate 1. *N. cobanensis*
- aa. Leaf-blade length of main-stem leaves mostly 2–5 times width, often some leaf blades lobed; heads discoid.
 - b. Phyllaries mostly obtuse to rounded-truncate at tips; paleae about as long as florets; corollas 3.5–4.5 mm long 2. *N. lobata*
 - bb. Phyllaries mostly acute at tips; paleae ca. $2/3$ as long as florets; corollas 5.5–6.5 mm long . . . 3. *N. macrophylla*

1. *Neurolaena cobanensis* Greenm. in Donn.Sm., Bot. Gaz. 37:418. 1904.

— TYPE: Guatemala, Alta Verapaz, Cobán, 1350 m, Feb 1903, *H. von Tuerckheim s.n.* [8414] (GH).

ILLUSTRATION: none found.

Coarse herbs or suffrutices, to 3+ m high; stems closely puberulent or glabrate; leaves obscurely petiolate, blades thin, membranous, very narrowly lanceolate or oblanceolate, rarely 3-lobed, 15–25(–40) cm long, 15–25(–50) mm wide, bases narrowly cuneate onto petioles, margins minutely and remotely toothed or entire, apices long-attenuate, abaxial faces dotted with resin globules, minutely appressed-scabrellous on nerves, adaxial faces sparsely and minutely scabrellous; heads 60–120+ in corymbiform aggregations 8–15+ cm across; peduncles 5–12(–20) mm long, puberulent; involucre cylindro-campanulate, 5–7 mm high; phyllaries 22–28, greenish to stramineous, minutely scabrellous, the outer lanceolate, 1–2 mm long, the inner lance-ovate, 3–7 mm long, scarious-margined, often ciliate, tips obtuse to acute; paleae stramineous similar to innermost phyllaries, more scarious, 4–6 mm long, apices obtuse-rounded to acute; ray florets usually 8, corollas yellow, tubes 3.5–4 mm long, laminae 3–5 mm long; disc florets 20–30, corollas yellow, tubes ca. 2.5 mm long, throats ca. 2 mm long, lobes narrowly deltate, ca. 0.8 mm long, minutely scabrellous, often dotted with resin globules; style branches 1.5 mm long; cypselae ca. 1.5 mm long; pappus bristles white, 1–5 mm long; flowering Jan–Feb.

Slopes and ridges in Evergreen Cloud and Pine-Oak-*Liquidambar* forests; rare in Northern and Eastern highlands; 1700–2300 m. Southern Mex. (Chis.), Guat., Nic. CHIAPAS COLLECTIONS: 32728; 33662.

2. *Neurolaena lobata* (L.) Cass. in F. Cuvier., Dict. sci. nat., ed. 2. 34:502. 1825. [Often attributed to R. Brown, Trans. Linn. Soc. London 12:120. 1818; combination was not made by Brown.]

— *Conyza lobata* L., Sp. Pl. 862. 1753. — *Calea lobata* (L.) Sw., Prodr. 113. 1788. — TYPE: Mexico, Veracruz, *W. Houston s.n.* (BM).

Conyza symphytifolia Mill., Gard. dict. ed. 8. no. 10. 1768. — *Pluchea symphytifolia* (Mill.) Gillis, Taxon 26:591. 1977. — NEOTYPE (Kahn and Jarvis 1989, Taxon 38:661): Mexico, Veracruz, *W. Houston s.n.* (BM).

Calea suriani Cass. in F. Cuvier, Dict. sci. nat., ed. 2. 6(suppl.): 33. 1817. — *Neurolaena suriani* (Cass.) Cass., J. Phys. Chim. Hist. Nat. Arts 87:29. 1818. — *Neurolaena integrifolia* Cass. in F. Cuvier, Dict. Sci. Nat. 34:501. 1825, nom. superfl. — TYPE: Antilles, *J. D. Surian s.n.* (P-JU).

Eupatorium valverdeanum Klatt, Bull. Soc. Roy. Bot. Belgique 31:188. 1892. — *Eupatorium chrysocephalum* Klatt, Bot. Beibl. Leopoldina 1895:2. 1895 [Compos. nov. costaricensis], nom. superfl. — *Critonia chrysocephala*

(Klatt) R. M. King & H. Rob., *Phytologia* 22:48. 1971. — LECTOTYPE (Turner 1982:134): Costa Rica, "Piedra del Convento entre General et Buenos-Aires," 30 Jan 1891, *H. Pittier* 3710 (GH).

Neurolaena fulva B. L. Turner, *Phytologia* 37:251. 1977. — TYPE: Mexico, Chiapas, Lagos de Montebello, 5100 ft. [1556 m], 13 Apr 1965, *D. E. Breedlove* 9678 (DS!; isotypes: F, MICH).

ILLUSTRATION: *Bot. Mag.* 42:t. 1734. 1815, as *Calea lobata*.

Coarse annuals or suffrutices, to 2(–5) m high; stems shaggy-hispidulous or fulvous, sometimes glabrate; leaves subsessile or with petioles 2–30 mm long and narrowly to moderately winged, blades either simply lanceolate and subentire to coarsely toothed or obscurely to prominently 3(–5+)-lobed, overall mostly 5–20(–30) cm long, 1–8(–15) cm wide, bases cuneate, margins usually coarsely and remotely toothed, apices acute to long-attenuate, abaxial faces dotted with resin globules and, usually, pilosulous to sparsely hirsutulous or villosulous, adaxial faces hispidulous to scabrellous; heads 10–150+ in dense to open corymbiform aggregations 5–20 cm across; peduncles 1–8(–15) mm long, densely villosulous to hispidulous or scabrellous, sometimes glabrate; involucre cylindro-campanulate, 5–7 mm high; phyllaries 21–36, yellowish green, strongly graduate, the outer lanceolate, 1–2 mm long, the inner more membranous, at least distally, lance-linear to linear, 3–7 mm long, 1–3-nerved, abaxially closely scabrellous or pilosulous, sometimes glabrate or glabrous, tips obtuse to rounded-truncate; paleae similar to innermost phyllaries, persistent, 4–7 mm long, usually 1-nerved, apices rounded-obtuse; ray florets none; disc florets 15–50+, corollas greenish yellow, tubes 1.5–2 mm long, distally scabrellous, throats 1.5–2 mm long, lobes ovate-deltate, 0.5–1 mm long, sometimes with resin globules on abaxial surfaces; style branches 1–1.5 mm long; cypselae 1.5–2.5 mm long, sparsely hispidulous distally; pappus bristles 3–5 mm long; $2n = 22$; flowering Nov–Apr.

Open or disturbed sites in Tropical Rain, Montane Rain, and Pine-Oak-Liquidambar forests; common in Northern and Eastern highlands and on E Central Plateau, rare in Central Depression, N interior Sierra Madre, and SE Sierra Madre; 100–1000(–1700) m. Common through eastern and southern Mex. (S.L.P., Hgo., Ver., Oax., Tab., Yuc., Chis.), through C.A.; Antill.; S.A. (Col., Ven., Sur., Fr. Gui., Ecu., Peru). CHIAPAS COLLECTIONS: *Br* 642 (CAS); *Br* 808 (CAS); *Calz* 9607 (TEX); *LG* 70 (CAS); *Den* 1644 (CAS); *GE* 1081 (TEX); *GQ* 349f (DS); *KI* 28 (DS); *L* 316 (DS); *Luc* 2577 (TEX); *LG* 23 (CAS); *Mz* 10172 (TEX); *Mz* 10626 (TEX); *Mz* 10740 (LL); *Mz* 10853 (TEX); *Mz* 11200 (TEX); *Mz* 11341 (TEX); *Mz* 16712 (TEX); *Neff* 93-4-10-2 (TEX); *Neff* 93-4-17-6 (TEX); *Pa* 221 (CAS); *PG* 162 (CAS); *P* 6797 (UC); *SL* 1246 (CAS); *So* 1728 (UC); *SI* 2395 (TEX); *Sund* 2431 (TEX); *T* 2423 (DS); *T* 3507 (DS); *T* 3775 (DS); *T* 3896 (DS); *T* 5510 (TEX); *T* 9624 (CAS); *Vi* 833 (TEX); *BV* 16-20 (DS); 9678; 15666; 24036; 24202; 33864; 41913; 49706; 49825; 50407; 50546; 57451.

According to my reading of Turner's (1982) key, descriptions, text, and specimen annotations, *N. fulva* differs from *N. lobata* in having 1) entire to faintly crenate or serrate vs. entire to coarsely serrate to variously lobed leaves, 2) "fulvous (greenish-yellow)" or "tawny" vs. "brownish" indument on stems, leaves, and

peduncles, 3) mostly 1–2-nerved and mostly glabrous vs. mostly 3-nerved and mostly scabrellous or puberulent inner phyllaries, and 4) "tightly corymbose ..." "tightly clustered ... overall pyramidal or somewhat flattened" (description) or "slightly congested rounded" (text) vs. "variously corymbose-paniculate" capitulescences. He indicated that all of the collections of *N. fulva* were from "mostly 1000–2000 m" and "from a restricted, relatively high mountainous, area of central Chiapas."

Doubtless, tawny pubescence is as striking on a *Neurolaena* in a rain forest as on a bonny lass abroad on the heath, but the plants segregated by Turner as *N. fulva* exhibit neither the morphological integrity nor geographic or elevational isolation ascribed to them by Turner. Of the six gatherings of *N. fulva* cited by Turner, three are from 1350–1550 m in the Montebello area of SE Central Plateau (*D. E. Breedlove* 9678, *M. Denton* 1611, and *A. S. Ton* 2123), one is from ca. 975 m in Eastern Highlands (*D. E. Breedlove* 15666), another is from ca. 1500 m on N slopes of Sierra Madre near Tres Picos in Municipio Villa Corzo (*D. E. Breedlove* 24056), and the last is from ca. 300 m in Northern Highlands near Veracruz border in Municipio Ocozacoatlán de Espinosa (*González Q.* 3491). The last-cited has velutinously sordid, not tawny or greenish yellow, indument and mostly 1-nerved, minutely scabrellous inner phyllaries. Other intermediate specimens include *D. E. Breedlove* 33864 (300 m in Municipio Ocosingo) and *D. E. Breedlove* 50546 (560 m in Municipio Cintalapa). *D. E. Breedlove* 41913 (1500 m, Dos Lagos, Montebello area) has lobed leaves, whitish-sordid hairs, (1–)3-nerved, glabrous, inner phyllaries, and a flattened-corymbiform capitulescence.

3. *Neurolaena macrophylla* Greenm., *Proc. Amer. Acad. Arts* 39:118. 1903.

— LECTOTYPE (Turner 1982:129): Mexico, Chiapas, "Chicarras," 1000–2000 m, 6 Feb 1896, *E. W. Nelson* 3766 (GH; isotype: US).

ILLUSTRATION: **Fig. 31.**

Coarse suffrutices, shrubs, or trees, to 4(–8) m high; young stems closely pilose or appressed-puberulent; petioles 2–10 mm long, leaf blades oblanceolate to narrowly obovate, 15–30(–60) cm long, 4–10(–15) cm wide, bases narrowly cuneate, margins subentire to remotely serrate, apices acuminate to attenuate, abaxial faces nearly glabrous, adaxial faces scabrellous; heads 60–100+ in rounded, corymbiform aggregations 12–20 cm across; peduncles 3–10(–15+) mm long, sparsely pilosulous; involucre cylindro-campanulate, 5–7 mm high; phyllaries ca. 35, the outer lanceolate, 1–2 mm long, the inner lance-ovate to linear, 3–7 mm long, apices acute, all puberulent to glabrate; paleae similar to inner phyllaries, linear, 5–6 mm long, apices acute; ray florets none; disc florets ca. 20, corollas yellow, tubes 2.5–3 mm long, distally puberulent, throats 2.5–3 mm long, lobes deltate, ca. 0.5 mm long; style branches ca. 1.5 mm long; cypselae ca. 2 mm long; pappus bristles whitish to sordid, 4–6 mm long; flowering Feb.

For Chiapas, *N. macrophylla* is known only from the type collection (from north-northwest of Tapachula, Sierra Madre);

otherwise the taxon is known only from thickets and wet forests of SW Guatemala at 900–1500 m.

46. OTOPAPPUS

- Otopappus* Benth. in G. Bentham and J. D. Hooker, Gen. pl. 2:380. 1873. — *Zexmenia* La Llave sect. *Otopappus* (Benth.) O. Hoffm. in A. Engler and K. Prantl, Nat. Pflanzenfam. 4(5):238. 1890. — TYPE: *Otopappus verbesinoides* Benth.
Notoptera Urban, Symb. antill. 2:465. 1901. — *Notoptera* Urban sect. *Eunotoptera* S. F. Blake, J. Bot. 53:202. 1915. — TYPE: *Notoptera hirsuta* (Sw.) Urban = *Bidens hirsuta* Sw. = *Otopappus hirsutus* (Sw.) R. L. Hartm. & Stuessy.
Notoptera Urban sect. *Loxosiphon* S. F. Blake, J. Bot. 53:225. 1915. — *Otopappus* Benth. sect. *Loxosiphon* (S. F. Blake) R. L. Hartm. & Stuessy, Syst. Bot. 8:201. 1983. — *Otopappus* Benth. ser. *Loxosiphon* (S. F. Blake) R. L. Hartm. & Stuessy, Syst. Bot. 8:201. 1983. — TYPE: *Notoptera curviflora* (R. Br.) S. F. Blake = *Salmea? curviflora* R. Br. = *Otopappus curviflorus* (R. Br.) Hemsl.
Notoptera Urban sect. *Perigynia* S. F. Blake, J. Bot. 53:227. 1915. — TYPE: *Notoptera tequilana* (A. Gray) S. F. Blake = *Zexmenia tequilana* A. Gray = *Otopappus tequilanus* (A. Gray) B. L. Rob.
Otopappus Benth. ser. *Hirsutus* R. L. Hartm. & Stuessy, Syst. Bot. 8:201. 1983. — TYPE: *Bidens hirsuta* Sw. = *Otopappus hirsutus* (Sw.) R. L. Hartm. & Stuessy

Sprawling shrubs, clamberers, or vines, sometimes trees, 2–4(–15) m high; leaves opposite, petiolate, blades ovate to lanceolate, pinnatinerved or 3(–7)-nerved from near their bases, bases obtusely cuneate to rounded or cordate, margins entire or serrulate to dentate, apices obtuse to acuminate or attenuate, faces subglabrous to scabrellous, pilose, or subtomentose, sometimes vernicose or resin-gland-dotted; heads borne singly or 2–15(–ca. 100) in corymbiform-paniculiform or racemiform clusters; peduncles stout to slender, sometimes bracteolate, commonly appressed-scabrellous or pilose; involucre mostly campanulate to hemispheric, 3–9 mm high; phyllaries 16–40, strongly imbricate, the outermost sometimes herbaceous or foliaceous, otherwise somewhat chartaceous to scarious and ovate to lance-linear, innermost intergrading with or sharply contrasting with paleae; receptacles convex to conic, sometimes fistulose; paleae strongly persistent, chartaceous to scarious, mostly longer than florets, navicular, carinate, often indurate and cuspidate to subulate at reflexed, erect, or inflexed tips; ray florets none or 7–40, pistillate and fertile or neuter, corollas yellow to yellow-orange, inconspicuous to showy, laminae ovate to linear; disc florets 20–120, bisexual, fertile, corollas yellow or whitish-ochroleucous, tubes shorter than the gradually funnelform to abruptly campanulate throats, sometimes tube/throat sharply recurved, tubes and throats glabrous, lobes 5, deltate to lance-ovate, reflexed or inflexed, sometimes hirsutulous abaxially and papillate on adaxial margins; style branches slender, stigmatic almost to rounded or attenuate, hirtellous tips; cypselas bodies brownish to black, usually flattened, sometimes weakly 3–4-angled, narrowly oblanceolate to spatulate in outline, faces glabrous or puberulent, often striate-nerved, adaxial margins typically winged, at least distally, the wings stramineous, oblique, each connate with an adaxial pappus element, abaxial margins sometimes similarly but less pronouncedly winged, other pappus of free, subulate squamellae or a corona of free or connate, erose to lacerate scales; $x=16$.

Fifteen or so species ranging from central and southern Mexico to Nicaragua and Jamaica.

REFERENCE: HARTMAN, R. L. and T. F. STUSSEY. 1983. Revision of *Otopappus* (Compositae, Heliantheae). Syst. Bot. 8:185–210.

- a. Leaves not resin-gland-dotted; outermost phyllaries distally herbaceous, often foliaceous, often reflexed or spreading; heads radiate; corollas yellow to orange.
 - b. Leaf blades obscurely, if at all, triplinerved from near their bases, seldom vernicose; paleae mostly 9–11 mm long; ray florets mostly 13–21(–28) 3. *O. scaber*
 - bb. Leaf blades usually triplinerved from near their bases, often vernicose; paleae 7–8 mm long; ray florets mostly 9–12(–16) 4. *O. verbesinoides*
- aa. Leaves resin-gland-dotted abaxially; outermost phyllaries mostly chartaceous, erect, appressed; heads discoid; corollas white to ochroleucous.
 - c. Involucres 3–5 mm long, phyllaries intergrading with paleae 3.5–5 mm long; corollas typically recurved.
 - d. Heads in strict, racemose or thyrsoid aggregations, seldom exceeding the leaves; peduncles 0–3(–10) mm long 1. *O. brevipes*
 - dd. Heads in open, corymbiform-paniculate clusters, mostly exceeding the leaves; peduncles 5–12(–20) mm long 2. *O. curviflorus*
 - [cc. involucres 3–4.5 mm long, phyllaries contrasting with paleae 5–7 mm long; corollas typically erect; not known from Chiapas; collected below 300 m in Mex. (Tab., Camp., Yuc.), Guat., and Bel. *O. guatemalensis* (Urban) R. L. Hartm. & Stuessy]

1. *Otopappus brevipes* B. L. Rob., Proc. Amer. Acad. Arts 44:621. 1909.

— *Notoptera brevipes* (B. L. Rob.) S. F. Blake, J. Bot. 53:227. 1915. — TYPE: Mexico, Chiapas, Nov–Dec

1864–70, *A. B. Ghiesbreght s.n.* [541] (GH; isotypes: BM, MO).

Otopappus curviflorus (R. Br.) Hemsl. var. *glabratus* J. M. Coult., Bot. Gaz. 20:50. 1895. — *Salmea curviflora* R. Br. var. *glabrata* (J. M. Coult.) Greenm., Publ. Field Columbian Mus., Bot. Ser. 3:124. 1904. — *Otopappus brevipes* B. L. Rob. var. *glabratus* (J. M. Coult.) B. L. Rob., Proc. Amer. Acad. Arts 41:622. 1909. — *Otopappus glabratus* (J. M. Coult.) S. F. Blake, J. Bot. 53:234. 1915. — TYPE: Guatemala, Santa Rosa, Volcán Jumaytepeque, 1000 ft. [305 m], Nov 1892, *E. T. Heyde* and *E. Lux* 4235 (F; isotypes: F, GH, K, MO, NY, US).

ILLUSTRATION: Fig. 32.

Shrubs or clamberers, to 3(–7) m high; young stems shaggy-hirsutulous with sordid hairs; petioles 8–22 mm long, pilosulous, leaf blades lanceolate to lance-ovate, mostly 8–15 cm long, 2.5–6 cm wide, pinnatinerved, bases cuneate or rounded, margins subentire to serrate with callose teeth, apices attenuate, abaxial faces resin-gland-dotted and sparsely to densely pilosulous to subtomtose (to subglabrous), adaxial faces appressed-pubescent or strigillose, very sparsely gland-dotted; heads in clusters of 1–3 compounded into narrowly racemiform or thyrsiform, bracteate or leafy associations of 20–100+ heads; peduncles 0–3(–10) mm long; involucre 3–5 mm high; phyllaries 20–30, the outer shorter, ovate to lance-ovate, the inner lance-linear, intergrading with paleae, all stramineous with darker nerves distally, minutely stipitate-glandular and pilosulous abaxially, ciliolate; receptacles ovoid-conic, ca. 2 mm diam., fistulose; paleae stramineous or dark, 3.5–5 mm long, acuminate, often apically recurved; ray florets none; disc florets 30–40(–70), corollas white to ochroleucous, drying purplish brown, 4–5 mm long, often sharply recurved, glabrous, tubes 1–1.5 mm long, throats 2.5–3 mm long, abruptly ampliate near middle, lobes lance-ovate, 0.6–0.8 mm long, often becoming inflexed; style branches ca. 1.3 mm long, rounded at tips; cypselas bodies 2–2.5 mm long, glabrous or distally sparsely hairy, the adaxial margins usually winged distally, the wings 1.5–2.5 mm long, 0.6–0.8 mm wide, each connate with an adaxial pappus element, other pappus of 0–3 subulate awns 0.5–1 mm long, sometimes the abaxial element ± winged; flowering Nov–Jan.

Heavily wooded slopes in Montane Rain and Pine-Oak-Liquidambar forests; rare on Central Plateau, uncommon in Sierra Madre; 712–2100 m. Southern Mex. (Chis.), Guat., Hond., Salv., Nic. CHIAPAS COLLECTIONS: *Bo* 8329 (LL); *Br* 799 (CAS); *EM* 809 (LL); *EM* 1907 (GH, LL, MICH, MO, NY, US); *T* 1888 (DS); *T* 3543 (DS, LL); 30221; 41687; 56950.

Types of the names *Otopappus brevipes* and *O. curviflorus* may prove to be conspecific.

2. *Otopappus curviflorus* (R. Br.) Hemsl. in F. Godman and O. Salvin, Biol. cent.-amer., Bot. 2:191. 1881.

— *Salmea*? *curviflora* R. Br., Trans. Linn. Soc. London 12:112. 1818 [1817]. — TYPE: Grown in England, origin unknown, possibly *W. Houstoun* (BM).

Notoptera scabridula S. F. Blake, J. Bot. 53:226. 1915. — LECTOTYPE: (Hartman and Stuessy 1983:202): Mexico,

Veracruz, Atoyac, Nov 1882, *E. Kerber* 131 (BM; isolecotypes: C, GH, K, MICH).

ILLUSTRATION: Fig. 33.

Mostly shrubs, sometimes clamberers, to 1(–8) m high; young stems puberulent; petioles 5–10(–18) mm long, leaf blades ovate to lanceolate, mostly 5–9(–18) cm long, 1–3(–6) cm wide, pinnatinerved or obscurely 3-nerved from above their bases, bases cuneate to rounded-truncate, margins entire or serrate, apices acute to somewhat attenuate, abaxial faces resin-gland-dotted and puberulent to subtomtose, adaxial faces appressed-pubescent or strigillose, sparsely gland-dotted; heads 20–60 in terminal and axillary, open, corymbiform to paniculiform clusters 8–12+ cm across, heads usually held beyond the leaves; peduncles mostly 5–12(–20) mm long; involucre 3–4 mm high; phyllaries 16–24, the outer shorter, ovate to lance-ovate, the inner lanceolate to lance-linear, intergrading with paleae, all stramineous with darker nerves or apices, glabrous or puberulent, minutely ciliolate; receptacles conic, ca. 2 mm diam., fistulose; paleae stramineous or dark, ca. 3.5 mm long, acuminate-indurate, apically recurved; ray florets none; disc florets 30–50, corollas white to greenish, drying purplish brown, ca. 4 mm long, much as in *O. brevipes*; style branches ca. 1 mm long, rounded at tips; cypselas bodies ca. 3 mm long, glabrous or sparsely hairy, faces obscurely to prominently nerved, the distal adaxial margin of each usually with a wing 1–1.5 mm long, ca. 0.6 mm wide, connate with the adaxial pappus element, other pappus none or of 1(–2) subulate awns to 1 mm long, sometimes the abaxial minutely winged; flowering Dec–Feb.

In Tropical Rain, Lower Montane Rain, and Evergreen Seasonal forests; uncommon in Eastern Highlands; 350–760 m. Southern Mex. (Ver., Oax., Camp., Chis.), Guat., Bel., Hond., Nic. CHIAPAS COLLECTIONS: *J* 1621 (US); 33354; 56353; 57935; 57956.

3. *Otopappus scaber* S. F. Blake, Contr. U.S. Natl. Herb. 22:636. 1924.

— TYPE: Mexico, Campeche, Apazote, near Yahaltun [Yohaltun], 26 Dec 1900, *E. A. Goldman* 482 (US; isotype: F).

ILLUSTRATION: none found.

Shrubs or clamberers, to 3(–5+) m high; young stems appressed-pubescent or strigillose; petioles mostly 5–10 mm long, leaf blades lanceolate to broadly lance-ovate, 6–15 cm long, 2–8 cm wide, pinnatinerved or obscurely 3-nerved from near their bases, bases cuneate to rounded, margins sharply serrate to subentire, apices acuminate to attenuate, abaxial faces subglabrous to hispidulous or scabrellous, not gland-dotted, adaxial faces scabrellous; heads (1–)3–5+ in loose terminal and axillary aggregations; peduncles 5–30+ mm long; involucre proper (excluding foliose outer phyllaries) mostly 7–9 mm high, 10–15 mm diam.; phyllaries ca. 30–40, the outermost usually herbaceous-foliaceous, spreading to reflexed, 2–15+ mm long, the inner greenish to stramineous, more chartaceous, ovate to lance-linear, some with herbaceous, reflexed tips, closely strigillose to scabrellous, ciliolate, the innermost intergrading with paleae; receptacles low-convex, not fistulose; paleae, stramineous, 9–11 mm long, subulate to acuminate, somewhat flexuose at tips; ray florets (13–)16–28, corollas

yellow, glabrous, tubes ca. 2 mm long, laminae narrowly ovate to linear-spatulate, 5–12 mm long, 1.5–1.5 mm wide; disc florets ca. 50–100, corollas yellow to orange, 6–7 mm long, glabrous but for lobe-tips, tubes slender, 1.5–2 mm long, throats narrowly funnelform, 3.5–4 mm long, lobes narrowly lance-ovate, ca. 1 mm long; style branches ca. 2.5 mm long, attenuate; cypsela bodies 4.5(3.5–5) mm long, glabrous or nearly so, faces obscurely to prominently nerved, adaxial margins distally winged, the wings 2–3 mm long, 1–1.5 mm wide, connate with adaxial pappus elements, other pappus elements forming a corona 0.5–1.5 mm high, sometimes the abaxial edges slightly winged-awned; $2n = 32$; flowering Oct–Dec.

Wooded slopes or disturbed places in Lower Montane Rain, Evergreen Seasonal, Tropical Deciduous, and Pine-Oak forests; rare in Northern Highlands, common in Central Depression, extending onto lower Central Plateau; 320–1400 m. Mex. (Camp., Chis.), Guat., Bel. CHIAPAS COLLECTIONS: *Crq* 10464 (DS, TEX); *Crq* 10497 (DS, TEX); *Crq* 11222 (MICH, NY); *L* 2734 (DS); *T* 3185 (DS); *TW* 2293 (TEX); 13345; 30346; 46403; 46995; 47095; 47634; 48405; 53645; 54036; 54388; 55468.

Plants here treated as *Otopappus scaber* and *O. verbesinoides* are very similar in expressions of some characters and seem to intergrade in other characters; their nomenclatural types may be conspecific. *D. E. Breedlove* 48250 (Municipio Ocosingo, ca. 70 km SW Palenque on road to Ocosingo, 550 m, 4 Dec 1980) may also belong here; it was collected with fairly typical *O. scaber*; it has smaller than usual heads (involucre 8–9 mm diam.) and larger ray corollas (laminae 12–15 mm long, 4–5 mm wide).

4. *Otopappus verbesinoides* Benth., Hooker's Icon. Pl. 12:47., t. 1153. 1873.

—LECTOTYPE: (Hartman and Stuessy 1983:191): Nicaragua, Chontales, 1867–1868, *R. Tate* 145 (K).

Otopappus trinervis S. F. Blake, J. Bot. 53:231. 1915. —TYPE: Mexico, Chiapas, Finca Irlanda [Tolanda on label at UC], 15°09'N, 92°19'W (fide Sousa S. 1969), Sep 1913, *C. A. Purpus* 6678 (BM; isotypes: F, GH, MO, NY, UC!, US).

Otopappus asperulus S. F. Blake, Contr. U.S. Natl. Herb. 24:30, pl. 10. 1922. —TYPE: Honduras, Copán, Hacienda La Zumbadora, between El Paraíso and La Florida, 13 May 1919, *S. F. Blake* 7400 (US; isotype: GH).

ILLUSTRATION: Hooker's Icon. Pl. 12: t. 1153. 1873.

Shrubs, to 3 m high; young stems subglabrous to appressed-pubescent or scabrellous; petioles (2–)5–12+ mm long, some obscurely winged, leaf blades lanceolate, 6–15 cm long, 2–6 cm wide, usually 3-nerved from near their bases, bases cuneate to rounded, margins subentire to dentate, apices attenuate, faces subglabrous to sparsely appressed-scabrellous, often vernicose, not gland-dotted; heads 1–12 in loose to congested, terminal and axillary, leafy or bracteolate aggregations, peduncles 2–20 mm long; involucre mostly 4–6 mm high, 7–9 mm diam., excluding outermost, sometimes foliaceous phyllaries; phyllaries 25–40, the outermost typically herbaceous, often foliaceous, spreading to reflexed, 3–15(–35) mm long, the rest greenish-stramineous, chartaceous (some with herbaceous, reflexed tips), lance-ovate to lance-linear, closely scabrellous and ciliate, the innermost intergrading with paleae; receptacles convex, not fistulose; paleae stramineous or darker, 7–8 mm long, each acuminate to a somewhat reflexed, indurate tip; ray florets 9–12(–16), corollas yellow, somewhat fleshy, glabrous, tubes ca. 2 mm long, laminae ovate to linear, (4–)7–12 mm long, 1.5–2.5 mm wide; disc florets 30–80, corollas yellow (to ochroleucous?), sometimes drying brownish, 5–6.5 mm long, glabrous (lobes sometimes sparsely hispidulous), tubes 1–1.5 mm long, throats campanulate-funnelform, 3–4 mm long, lobes lance-ovate, ca. 1 mm long; style branches ca. 2 mm long, attenuate; cypsela bodies 3–4 mm long, glabrous, sometimes 3–5-nerved on faces, adaxial margins usually winged, the wings broader distally, to ca. 1 mm wide, each connate 3–4 mm with an adaxial pappus element, abaxial margins usually with similar, narrower wings connate with pappus elements, other pappus a corona 0.5–1.5 mm high; flowering Oct–Jan.

Wooded slopes in Lower Montane Rain, Montane Rain, and Evergreen Seasonal forests; uncommon in Northern Highlands, common on E Central Plateau and in SE Sierra Madre; 500–2100 m. Southern Mex. (Ver., Oax., Chis.), Guat., Bel., Hond., Salv., C.R. CHIAPAS COLLECTIONS: *Crq* 10496 (DS, TEX); *EM* 863 (LL); *EM* 1655 (DS, LL); *P* 6678 (UC); *Sund* 2380 (TEX); *RT* 41704 (DS); *T* 3774 (DS); *T* 5002 (TEX); *Z* 628 (DS); 14007; 30840; 31975; 38787; 46024; 46702; 48749; 55484; 55751; 56148; 56361; 56498, 70599.

Taxon to be looked for in Chiapas:

Otopappus guatemalensis (Urban) R. L. Hartm. & Stuessy. See couplet c/cc in key.

47. PARTHENIUM

Parthenium L., Sp. Pl. 988. 1753. —LECTOTYPE: (N. L. Britton and A. Brown, Ill. fl. n. U.S., ed. 2. 3:464. 1913): *Parthenium hysterothorus* L.

Argyrochaeta Cav., Icon. 4:54, t. 378, 1797. —TYPE: *Argyrochaeta bipinnatifida* Cav. = *Parthenium bipinnatifidum* (Ortega) Rollins.

Villanova Ortega, Nov. pl. descr. dec. 4:47. 1797. [Nom. rej. vs. *Villanova* Lag. 1816.] —TYPE: *Villanova bipinnatifida* Ortega = *Parthenium bipinnatifidum* (Ortega) Rollins.

Bolophyta Nutt., Trans. Amer. Philos. Soc., ser. 2. 7:347. 1810. —TYPE: *Bolophyta alpina* Nutt. = *Parthenium alpinum* (Nutt.) Torr. & A. Gray.

Partheniastrum Fabr., Enum. 82. 1759. = *Parthenium* L., fide ING.

Hysterothorus Adans., Fam. pl. 2:128. 1763. = *Parthenium* L., fide ING.

Echetosis Phil., Anales Univ. Chile 43:504. 1873. —TYPE: *Echetosis pentasperma* Phil. = *Parthenium hysterothorus* L.

Annuals, perennial herbs, shrubs, or small trees; leaves alternate, sometimes in basal rosettes, entire, toothed, or highly pinnatisect, commonly scabrellous, tomentose, or sericeous; heads usually in congested to open corymbiform or paniculiform masses; involucre campanulate to hemispheric or saucer-shaped, mostly 2–6(–10) mm diam.; phyllaries 10 in 2 series, the outer 5 subtending the inner, typically more herbaceous and shorter and narrower than the membranous to scarious, rotund inner ones; receptacles flat to convex; paleae scarious-membranous, cuneiform to flabellate and conduplicate, sometimes somewhat cucullate, distally densely papillose or fimbriate; ray florets 5(4–7), pistillate, fertile, corollas white to pale yellow, persistent, often inconspicuous, tubes stout, beset with glandular hairs, laminae reniform to orbicular; disc florets mostly 20–60(–80), functionally staminate, corollas pale yellow or ochroleucous, tubes slender, about equal to the funnelliform or campanulate throats, lobes deltate; styles unbranched, clavate, capitate; cypselae each shed as part of a complex structure comprising one inner phyllary, a cypselae, and 2 contiguous, immediately adaxial disc florets with their subtending and infolding paleae, the cypselae proper blackish, triquetrous or ob-flattened, cuneiform, adaxially carinate and, distally, often granular-papillose; pappi none or of 1–2 squamellae or 1–3 awns; $x = 9$.

A New World genus of 16–20 species, mostly Mexican, ranging natively from Wyoming and Utah, Michigan and Minnesota, and Virginia south through much of Mexico and Antilles; also in South America (Arg., Bol., Guy., Ven.). *Parthenium hysterophorus* is weedy and cosmopolitan in dry tropics and subtropics.

REFERENCE: ROLLINS, R. C. 1950. The guayule rubber plant and its relatives. Contr. Gray Herb. 172:1–72.

- a. Annuals; leaf blades pinnatifid or bipinnatifid 2. *P. hysterophorus*
 aa. Shrubs or trees; leaf blades lance-ovate to deltate, subentire to crenate, not divided 1. *P. fruticosum*

1. *Parthenium fruticosum* Less., Linnaea 5:152. 1830.

— TYPE: Mexico, Veracruz, "In Plan del Rio," Jul, C. J. W. Schiede and F. Deppe s.n. [334]. (B?, destroyed; ?isotype: GH).

Parthenium parviceps S. F. Blake, Contr. U.S. Natl. Herb. 22:607. 1924. — TYPE: Mexico, Veracruz, Zacuapan, Barranca de Tenampa, Aug 1906, C. A. Purpus 1849 (US; isotype: UC!).

Parthenium fruticosum Less. var. *trilobatum* Rollins, Contr. Gray Herb. 172:31. 1950. — TYPE: Mexico, Tamaulipas, Sierra de San Carlos, vicinity of Marmolejo, 11 Aug 1930, H. H. Bartlett 10898 (US).

ILLUSTRATION: none found.

Shrubs or trees, to 3(–4) m high; petioles 1–4 cm long, narrowly and evenly winged to broadly and lobulately winged, leaf blades lance-ovate to deltate, sometimes obscurely 3-lobed, 5–10(–15) cm long, 2–6(–9) cm wide, triplinerved, bases truncate to cuneate, margins subentire to crenate, apices acute, abaxial faces densely tomentose to sparsely pilosulous, usually dotted with resin globules, adaxial faces strigoso-hispid; heads in open to congested corymbiform or paniculiform masses; peduncles 1–4(–6) mm long, piloso-tomentose; involucre campanulate to hemispheric, 3–4 mm diam.; outer phyllaries greenish-stramineous, lance-ovate to suborbicular, 1–2 mm long, pilosulous, inner phyllaries similar but more membranous, 2–4 mm long, pilosulous and, distally, densely papillose or fimbriate; paleae greenish-stramineous to ochroleucous, 2.5–3.5 mm long; ray corollas pale yellow, tubes ca. 0.4 mm long, laminae reniform to suborbicular 0.8–1 mm long; disc florets 20–40, corollas yellowish, 2.5–3 mm long, tubes very slender, ca. 1 mm long, throats funnelliform to campanulate, ca. 1 mm long, lobes ovate-deltate, ca. 0.5 mm long; cypselae 1.5–2 mm long; pappi none or of 1–3 awns or squamellae to ca. 1 mm long; $2n = 36$; flowering Aug–Sep.

Flats and canyon walls in Tropical Deciduous Forest; rare in Central Depression; 700–1000 m. Southern Mex. (N.L., Tam., S.L.P., Ver., Oax., Chis.). CHIAPAS COLLECTIONS: RMK 3098 (DS, TEX, UC); EWN 2965 (GH, US); 36560; 37479; 70598.

The nomenclatural type of *Parthenium schottii* Greenm. from the Yucatán Peninsula may prove to be conspecific with that of *P. fruticosum*.

2. *Parthenium hysterophorus* L., Sp. pl. 988. 1753.

— *Parthenium pinnatifidum* Stokes, Bot. Mat. Med. 4:278. 1812, nom. superfl. — TYPE: Grown in Uppsala from Jamaican seed, Linn. herb. 1115.1.

Parthenium lobatum Buckley, Proc. Acad. Nat. Sci. Philadelphia 1861: 457. 1862. — TYPE: "Western Texas. June," S. B. Buckley s.n. (PH).

Echetrosia pentasperma Phil., Anales Univ. Chile 43:504. 1873 — TYPE: Argentina, "halla en la provincia de Mendoza"; no specimen cited; use of this name here is based on the description.

ILLUSTRATIONS: Fig. 34; Ann. Missouri Bot. Gard. 62:1095 [Fl. Pan.].

Annuals, to 5(–12) dm high; leaves pinnatifid to bipinnatifid, deltate to lanceolate in overall outline, mostly 5–10(–15) cm long, the segments linear to lanceolate, mostly 5–30(–50) mm long, 2–5(–10) mm wide, faces sparsely to densely scabrellous to appressed-strigillose, dotted with resin globules, blades reduced and lance-linear in capitulescence; heads in corymbiform to paniculiform masses; peduncles mostly 3–12 mm long, appressed-strigillose; involucre broadly hemispheric to saucer-shaped, 2–4 mm diam.; outer phyllaries herbaceous, proximally whitish, distally greenish, lanceolate to lance-ovate, 2–4 mm long, strigillose, at least distally, the inner ochroleucous, membranous to scarious, ovate to subrotund, 2.5–5 mm

long, distally papillose-ciliate; paleae whitish, membranous, 1–3 mm long; ray corollas white to pale yellow, tubes ca. 0.2 mm long, laminae reniform to orbicular, 0.3–1 mm long; disc florets 20–60, corollas whitish, ca. 2 mm long, tubes slender, about equal to the campanulate throats, lobes deltate-ovate, ca. 0.4 mm long; cypselae 1.5–2.5(–3.5) mm long; pappi of 1–2, stramineous, lanceolate squamellae 0.5–1 mm long; $2n = 34$; flowering mostly Apr–Oct.

Ruderal, especially in disturbed places, in Evergreen Seasonal, Tropical Deciduous, Pine-Oak-*Liquidambar*, and Pine-Oak forests; common in Central Depression, uncommon or rare

in Eastern and Northern highlands; 400–1350 m. Cosmopolitan weed of dry tropics and subtropics and extending into temperate regions; Mex. (Chih., Coah., N.L., Tam., Sin., Dgo., Zac., S.L.P., Nay., Jal., Cma., Mich., Méx., Pue., Ver., Gro., Oax., Camp., Yuc., Q. Roo., Chis.), Guat., Bel., Hond., Pan.; Antill.; S.A. CHIAPAS COLLECTIONS: *Cro* 64809 (UC); *GE* 2005 (CAS); *RMK* 2754 (DS, UC); *Lan* 813 (TEX); *Las* 810630-3 (UC); *L* 787 (DS); *L* 2011 (DS); *Mz* 8222 (TEX); *SC* 744 (CAS); *Sau* 46 (LL); *Tel* 6567 (TEX); *T* 3094 (DS); *T* 6033 (TEX); *T* 7500 (TEX, UC); *BV* 64-5 (DS); 10285; 10621; 19809; 19983; 29056; 29156; 46423.

48. PECTIS

Pectis L., Syst. nat., ed. 10. 1221. 1759. — TYPE: *Pectis ciliaris* L.
For review of synonymy, see Keil (1975).

Annuals or perennials, mostly herbaceous, rarely suffrutescent or shrubby, usually strongly scented; leaves opposite, simple, blades usually narrow, entire, and bristly-setose, especially on proximal margins, variously dotted with oil-filled, pellucid glands; heads borne singly or in cymiform clusters, rarely sessile, mostly on terminal or axillary, slender to filiform, bracteolate peduncles; involucre cylindric to campanulate, 2–12+ mm high; phyllaries 3–12(–21), uniseriate, free to base, often indurate and carinate medially, usually dotted or streaked with pellucid glands, each ray cypselae and its subtending phyllary usually falling together as a unit; receptacles convex to hemispheric, smooth to foveolate-faceted; paleae none; ray florets usually 3, 5, 8, or 13, pistillate, fertile, corollas yellow to ochroleucous, often tinged with red, brown, or purple, laminae showy or reduced and inconspicuous; disc florets 1–50+, bisexual, fertile, corollas mostly yellow, sometimes reddish, lobes equal or 1 lobe longer than the others; style branches reduced to papillose knobs; cypselae mostly blackish, slender, terete or prismatic, often striate, wholly glabrous or variously hairy; pappi various, of bristles, awns, squamellae, erose scales, crowns, or combinations of these, or wanting; $x = 12$.

Perhaps 80 species; ranging from southwestern United States and Florida to southern Brazil, northern Argentina, and Galapagos Islands.

REFERENCES: KEIL, D. J. 1973. A re-evaluation of *Pectis* L. subgenus *Pectidopsis* Fernald. Ph. D. thesis, Ohio State University; ———. 1975. Tageteae [in Fl. Pan.]. Ann. Missouri Bot. Gard. 62:1220–1241; ———. 1977. Chromosome studies in North and Central American species of *Pectis* L. (Compositae: Tageteae). Rhodora 79:79–94; RYDBERG, P. A. 1916. *Pectis*. In N. L. Britton et al., N. Amer. fl. 34:194–216.

- a. Heads sessile to subsessile 5. *P. prostrata*
- aa. Heads distinctly pedunculate.
 - b. Prostrate perennials; involucre 10–12 mm high 4. *P. multiflosculosa*
 - bb. Erect to sprawling annuals or perennials; involucre less than 8 mm high.
 - c. Perennials.
 - d. Phyllaries mostly 7–12; disc florets mostly 20–40 6. *P. satireioides*
 - dd. Phyllaries mostly 5–8; disc florets 5–18.
 - e. Leaves pliable, blades narrowly elliptic to linear, mostly 10–30 mm long, 3–6 mm wide; ray corollas barely surpassing phyllaries 1. *P. bonplandiana*
 - ee. Leaves stiff, blades narrowly linear, mostly 15–40 mm long, 1–2 mm wide; ray corollas showy.
 - f. Disc florets mostly 5–9; cypselae 2–3 mm long; pappi of 2–5+ subulate squamellae 2. *P. linearis*
 - [ff. Disc florets mostly 6–18; cypselae ca. 3.5 mm long; pappi of 2–8 aristate squamellae plus 4–8 shorter, erose scales; not known from Chis. *P. capillipes* (Benth.) Hemsl.]
 - cc. Annuals.
 - [g. Disc florets 1–6, corollas with pellucid glands in some or all lobes; cypselae more than 3.5 mm long; pappi of 1–4, stout, widely spreading awns; not known from Chis. *P. linifolia* L.]
 - gg. Disc florets 3–19, corollas without pellucid glands; cypselae less than 3.5 mm long; pappi of erect bristles, squamellae, a crown, or wanting.
 - h. Involucres 2.1–2.6 mm high; disc florets 14–19, corollas 0.8–1.2 mm long 3. *P. minutiflora*
 - hh. Involucres 2.8–6 mm high; disc florets 3–15, corollas 1.2–4.3 mm long.

- i. Involucres mostly less than 4 mm high; disc florets mostly 3–5, corollas mostly less than 2 mm long; pappi crowns 0.1–0.3 mm high bearing 0–2 fine bristles or aristate squamellae to 2 mm long 7. *P. uniaristata*
- ii. Involucres mostly more than 4 mm high; disc florets 5–15, corollas usually more than 2 mm long; pappi of bristles, squamellae, or erose scales.
 - j. Leaf blades narrowly elliptic to linear, mostly 3–6 mm wide; disc corollas mostly 1.5–2.1 mm long; pappi of 8–12+, erose scales plus 0–5 bristles . . . 1. *P. bonplandiana*
 - j. Leaf blades linear, mostly 1–4 mm wide; disc corollas mostly 1.9–4.3 mm long; pappi of 2–10, subulate squamellae or fine bristles.
 - k. Peduncles mostly 20–40 mm long; pappi of 2–5+, subulate squamellae 2. *P. linearis*
 - [kk. Peduncles mostly 3–18 mm long; pappi of 5–10, fine bristles; not known from Chis. *P. elongata* Kunth]

1. ***Pectis bonplandiana* Kunth, Nov. gen. sp., ed. fol. 4:206. 1820 [1818] ; ed. qto. 4:263. 1820.**

— TYPE: Mexico, Querétaro, near Querétaro, Sep, *Humboldt* (P?).
Pectis swartziana Less., *Linnaea* 6:711. 1831. — TYPE: (fide Keil, 1975, p. 1231): “India Occidentalis et Jamaica,” *O. Swartz s.n.* (UPS, IDC microfiche 1036, 844:III.3).
For fuller synonymy, see Keil (1975) and Rydberg (1916).
ILLUSTRATION: none found.

Erect to spreading annuals or short-lived perennials, 5–30 cm high; leaf blades linear to narrowly elliptic, mostly 10–30 mm long, 3–6 mm wide, bearing 2–8 marginal setae near the base, apices acute, faces conspicuously dotted abaxially with pellucid glands; heads borne singly on slender, bracteolate, axillary or terminal peduncles 1–3 cm long; involucre cylindro-campanulate, 4–5 mm high; phyllaries mostly 5–8, linear to ovate, basally indurate and carinate, distally membranous and scarious-margined, mostly glabrous, each streaked or dotted with 2–8+ pellucid glands; ray florets mostly 5–8, corollas yellow to whitish or purple, laminae elliptic, strongly involute, ca. 1.5 mm long; disc florets ca. 5–15, corollas yellow, often tinged with purple, 1.5–2.1 mm long, 1 lobe much longer than the others; cypselae blackish, slender, sparsely hirtellous, 2.5–3 mm long; pappi variable, 8–12+ erose to lacerate scales and 0–5 bristles or very slender, aristate squamellae, sometimes reduced to a mere lacerate crown or wanting; $2n = 48$; flowering Sep–Feb.

Mangrove swamps or flats in Lower Montane Rain and Tropical Deciduous forests; rare in Eastern Highlands, in Central Depression, and on Pacific Coastal Plain; 3–800 m. Southern Mex. (Ver., Tab., Yuc., Chis.), Guat., Bel., Salv., C.R., Pan.; Antill.; S.A. (Col., Ven.). CHIAPAS COLLECTIONS: *EM* 4461 (LL); 20813; 37510; 46921; 49832; 55257.

Keil (1975) maintained plants with setose pappi (*Pectis bonplandiana* s.s.) distinct from those with pappi reduced to lacerate scales (*P. swartziana*).

2. ***Pectis linearis* La Llave, Reg. Trimestre 1:451. 1832.**

— TYPE: Mexico, Oaxaca, “prope Las Bacas,” Sep., *A. Pineda s.n.* (G-DC, IDC microfiche 800.787:II.7).

All Chiapan collections of this species are referable to:

2a. ***Pectis linearis* La Llave var. *linearis*.**

ILLUSTRATION: none found.

Erect, much-branched annuals, to 25 cm high; leaf blades linear, mostly 1–3 cm long, 1–2 mm wide, apices acute to obtuse, margins bristly ciliolate, at least at base, faces dotted with submarginal, pellucid glands; heads borne on slender, bracteolate, terminal or axillary peduncles mostly 2–4 cm long; involucre narrowly campanulate, mostly 4–6 mm high; phyllaries 5, sometimes purplish, linear to lanceolate, basally indurate-carinate, distally and marginally membranous to scarious, each bearing 0–6 pellucid glands, apices acuminate; ray florets 5, corollas yellow to ochroleucous, often roseate-tinged, laminae linear, involute, ca. 4.5 mm long; disc florets mostly 5–9, corollas yellow to ochroleucous, often roseate-tinged, 1.9–4.3 mm long, 1 lobe longer than the others; cypselae black, slender, 2–3 mm long, striate, sparsely strigillose; pappi of 2–5+, subulate, scabrelous squamellae to 5.1 mm long; flowering Sep.

Ruderal, grasslands and roadsides; rare in W Sierra Madre; ca. 700 m. Southern Mex. (Jal., Mich., Ver., Yuc., Oax., Chis.); Antill.; S.A. (Ven.). CHIAPAS COLLECTION: *P* 9176 (DS).

3. ***Pectis minutiflora* D. J. Keil, *Brittonia* 26:30, fig. 1. 1974.**

— TYPE: Mexico, Chiapas, “Jalisco” (= Arriaga, 16°14'N, 93°53'W), Sep 1923, *C. A. Purpus* 9162, part. (GH; iso-types F, MO, NY, UC!, US).

ILLUSTRATION: *Brittonia* 26:30. 1974.

Erect, diffusely branched annuals, to 15 cm high; leaf blades linear, mostly 5–25 mm long, bases bristly ciliolate, apices acute, faces dotted with mostly submarginal pellucid glands; heads borne singly on very slender, terminal or axillary, bracteolate peduncles 8–15 mm long; involucre broadly turbinate to campanulate, 2.1–2.6 mm high; phyllaries 5, ovate to obovate, medially carinate-indurate, marginally membranous to scarious, each bearing 2–6 pellucid glands; ray florets 5, corollas yellow to ochroleucous, laminae narrowly elliptic, 0.4–0.7 mm long; disc florets 14–19, corollas yellow, 0.8–1.2 mm long, 1 lobe longer than the others; cypselae black, ca. 1.2

mm long, minutely striate, glabrous; pappi none or each a minute crown; flowering Jul–Sep.

Known from only two collections: the type and Oaxaca, grazed areas 10–12 km E of Niltpec along route 190, 18 Jul 1959, *R. M. King 1830*, part (TEX).

4. *Pectis multiflosculosa* (DC.) Schultz-Bip. in B. C. Seemann, Bot. voy. *Herald* 309. 1856.

— *Lorentea multiflosculosa* DC., Prodr. 5:102. 1836. — LECTOTYPE: (Keil 1975:1229); Peru, "montibus Guanacenticibus," *T. Haenke s.n.* (G-DC, microfiche 800.788:II.3; isolectotype: M).

Pectis arenaria Benth., Bot. voy. *Sulphur* 110. 1845. — SYNTYPES: "Sands of the sea coast, Acapulco [Mexico, Guerrero]; Conchagua [Honduras]; Puna, near Guayaquil [Ecuador]" (all presumed to be in BM).

For fuller synonymy, see Keil (1975).

ILLUSTRATION: none found.

Coarse, prostrate, sprawling, somewhat succulent, perennial herbs, rooting at nodes, stems to 1(–3+) m long; leaf blades linear to oblanceolate, mostly 2–3 cm long, margins setose-ciliolate at base, apices obtuse to acute, abaxial faces dotted with mostly submarginal pellucid glands; heads borne singly on stout, bracteolate peduncles 1–3+ cm long; involucre cylindro-campanulate, 10–12 mm high; phyllaries 5–8, linear to obovate, weakly navicular, striate, scarious-margined basally; ray florets 5–8, corollas yellow, sometimes striped with reddish brown, laminae narrowly elliptic, 7–9 mm long; disc florets 20–40, corollas yellow, 5–8 mm long, 1 lobe much longer than the others; cypselae blackish, weakly clavate, 7–8 mm long, striate, sparsely hirtellous; pappi of 10–20, tawny to purplish, slender, arose to aristate, scabrous-margined squamellae to 7 mm long; $2n = 72$; flowering Jun and Oct.

Sandy beaches and dunes in Coastal Strand; uncommon (?) on Pacific Coastal Plain; ca. 3 m. Mex. (Sin., Nay., Jal., Cma., Mich., Oax., Chis.), Guat., Salv., Hond., Nic., C.R., Pan.; S.A.(Col., Ecu., Peru). CHIAPAS COLLECTIONS: *EM 2714* (LL); *Nee 32346* (TEX, UC); *We 17845* (DS); *20845*; *25569*; *51149*; *54162*.

5. *Pectis prostrata* Cav., Icon. 4:12, t. 324. 1797.

— TYPE: Grown in Spain from Mexican seed. (MA; probable isotype at F *vide* Keil, 1975, p. 1230).

Pectis multisetosa Rydb. in N. L. Britton et al., N. Amer. fl. 34:198. 1916. — TYPE: Guatemala, Santa Rosa, 1892, *E. T. Heyde and E. Lux s.n.* [4232] (NY).

For fuller synonymy, see Keil (1975).

ILLUSTRATION: see protologue.

Prostrate to weakly ascending, usually mat-forming, annuals (sometimes persisting), stems to 25+ cm long; leaf blades linear to oblanceolate, mostly 15–35 mm long, bases bearing 8–18, marginal, bristly setae, apices rounded to acute, faces sparsely to densely dotted with pellucid glands; heads sessile to subsessile in axils, borne singly or crowded; involucre campanulate to urceolate, 4.5–7.5 mm high; phyllaries 5, linear to obovate, carinate and somewhat indurate centrally, glabrous or puber-

ulent to subcanescent, striate, often bearing pellucid glands; ray florets 5, corollas yellow, often tinged with purple, laminae narrowly elliptic to ovate, often involute and drying erect, 1.5–2.2 mm long; disc florets mostly 7–12, corollas yellow, 1.9–2.5 mm long, 1 lobe longer than the others; cypselae black, slender, ca. 3 mm long, striate, subvillous; pappi of 2(ray) or 5(disc), white to purplish, slender, lanceolate to aristate, subequal squamellae 1.5–2.5 mm long; $2n = 24$; flowering Jul–Nov.

Ruderal in disturbed places (fields, streambanks, roadsides) in Savanna or Tropical Deciduous, Pine-Oak, or Evergreen Seasonal forests; uncommon in Northern Highlands, on Central Plateau, in Central Depression, and in Sierra Madre; 800–1700 m. Southern U.S. (Ariz., N. M., Tex., Fla.), Mex. (Baja C.S., Son., Chih., Coah., Sin., Dgo., S. L. P., Pue., Ver., Gro., Oax., Chis.), Guat., Bel., Hond., C.R., Pan.; Antill.; S.A. (Col., Ven.). CHIAPAS COLLECTIONS: *C 134* (DS); *27542*; *37740*; *37901*; *39686*; *40573*; *46085*; *46097*; *51657*; *51994*; *52736*; *54502*.

6. *Pectis satureioides* (Mill.) Schultz-Bip. in B. C. Seemann, Bot. voy. *Herald* 309. 1856.

— *Inula saturejoides* Mill., Gard. dict., ed. 8. 1768. —

Lorentea satureioides (Mill.) Less., Linnaea 5:135. 1830.

— TYPE: Mexico, Veracruz, *W. Houstoun s.n.* (BM?).

Pectis polyantha Rydb. in N. L. Britton et al., N. Amer. fl. 34:207. 1916. — TYPE: Nicaragua, "on Asseradores Island," 1903, *C. F. Baker 2133* (GH).

For fuller synonymy, see Rydberg (1916).

ILLUSTRATION: none found.

Erect or sprawling perennials, to 3 dm high; leaf blades linear to lanceolate, mostly 10–30 mm long, margins somewhat revolute, bristly setose-ciliolate, at least toward the base, apices acute, faces densely dotted with pellucid glands; heads borne singly on slender, bracteolate peduncles 3–12 cm long; involucre turbinate, mostly 5–7 mm high; phyllaries mostly 7–12, green or tinged with purple, obovate to oblanceolate, somewhat indurate and carinate at base, striate, scarious-margined, glabrous or puberulent to subcanescent; ray florets mostly 8–12, corollas yellow, often each with a medial purplish stripe, laminae narrowly elliptic, 5–9 mm long; disc florets mostly 20–40, corollas yellow, mostly 4–5 mm long, 1 lobe much longer than the others; cypselae blackish, slender, quadrate, striate, hirtellous to hispidulous, ca. 3 mm long; pappi of usually ca. 15, short, fine bristles subtending ca. 10 longer, coarser ones to 3 mm long, sometimes reduced or none in ray florets; $2n = 24$, 36; flowering Jul–Nov.

Roadsides, pond margins, and limestone ridges in Tropical Deciduous Forests or Savanna; uncommon on Gulf Coastal Plain, in Northern Highlands, and in Sierra Madre; 80–1600 m. Southern Mex. (Ver., Oax.), Guat., Hond., C.R., Nic. CHIAPAS COLLECTIONS: *Dav 20548* (MO, UC); *P 9118* (UC); *21089*; *24834*; *26668*; *39972*; *45955*; *46655*; *46780*; *46874*; *48519*; *51125*; *54055*; *54939*; *55312*.

7. *Pectis uniaristata* DC., Prodr. 5:99. 1836.

— TYPE: Mexico, *sine loc.*, *L. Alaman s.n.* (G-DC, IDC microfiche 800.787:III.3; fragment at F).

All Chiapan collections of this species are referable to:

7a. *Pectis uniaristata* DC. var. *holostemma*
A. Gray, Proc. Amer. Acad. Arts 19:46.
1883.

— TYPE: Mexico, "Consoquitla," Aug 1841, *F. M. Liebmann s.n.* [394]. (GH; isotypes C?, K, NY, US).

Pectis dichotoma Klatt, Leopoldina 20:92. 1884. — TYPE: Mexico, "Consoquitla," *F. M. Liebmann s.n.* [394] (C?; isotypes: GH, K, NY, US).

Additional synonymy in Keil (1973).

ILLUSTRATION: none found.

Erect, open to compact, distally much-branched annuals, mostly 8–40 cm high; leaf blades linear to oblanceolate, mostly 5–35 mm long, bristly ciliate at base, faces densely dotted with pellucid glands; heads borne singly or loosely cymiform-clustered on very slender, bracteolate, terminal peduncles mostly 5–20 mm long; involucre narrowly turbinate, 2.8–4.1 mm high; phyllaries 5, linear to oblong, somewhat navicular, glabrous, obscurely dotted with pellucid glands; ray florets 5, corollas ochroleucous to pale yellow, usually roseate-tinged, laminae narrowly elliptic, 1–2 mm long; disc florets mostly

3–5, corollas ochroleucous to pale yellow or roseate, 1.2–1.9 mm long, 1 lobe longer than the others; cypselae black, slender, 1.2–2.3 mm long, striate, glabrous or minutely hirtellous; pappus crowns 0.1–0.3 mm high, bearing 0–2 fine bristles or slender, aristate squamellae to 2 mm long; $2n = 24$; flowering Aug–Nov.

Roadsides and fields in Seasonal Evergreen Forest, Thorn Woodland, and Mangrove Swamp; rare(?) in Central Depression, in Sierra Madre, and on Pacific Coastal Plain; ca. 3–950 m. Southern Mex. (Oax., Chis.), Guat., Hond., Salv., C.R.; S.A.(Col.). CHIAPAS COLLECTIONS: *P* 9162, part (UC); 37700; 52167; 52735; 52835; 54503; 54539.

Some of the specimens cited here as *Pectis uniaristata* var. *holostemma* may prove to be members of *Pectis elongata* Kunth.

Taxa to be looked for in Chiapas:

***Pectis capillipes* (Benth.) Hemsl.** — Guat., Salv., Nic., C.R. See couplet f/ff in key.

***Pectis elongata* Kunth** — Mex. See couplet k/kk in key.

***Pectis linifolia* L.** — Ariz., Mex., Antill., S.A. See couplet g/gg in key.

49. PERITYLE

Perityle Benth., Bot. voy. Sulphur 23. 1845. — TYPE: *Perityle californica* Benth.
For full synonymy, see Powell (1969, 1973, 1974).

Suffrutescent or herbaceous perennials or annuals, mostly less than 6 dm high; leaves opposite or alternate, usually petiolate, variable in size and shape, entire or toothed to lobed or finely dissected, variously pubescent or glabrous, frequently viscid; heads borne singly or in cymiform, corymbiform, or paniculiform associations; peduncles short to long, bracteolate or not, sometimes swollen and fistulose; involucre subcylindric to hemispheric, 3–12 mm high; phyllaries mostly 21–35, equal to subequal in 1–3 series, ovate to obovate, oblanceolate, or linear, often carinate, \pm scarious-margined; receptacles flat to convex, alveolate; paleae none; ray florets mostly 8–21 or none, pistillate, fertile, corollas yellow to white, sometimes purple-tinged, showy to inconspicuous; disc florets mostly 20–50+, bisexual, fertile, corollas yellow to white or purple-tinged, usually glandular-puberulent, tubes about equalling the funnelliform to campanulate throats, lobes 5, equal; style branches with minute, papillate appendages; cypselae blackish, usually flattened and with glabrous or densely ciliate, callous margins, faces glabrous or sparsely hairy; pappi various: lacinate to erose crowns plus 2 bristles [0–2 bristles, or 10+ bristles, or none]; $x = 17$ or 19.

About 55 species, mostly in southwestern United States and northwestern Mexico; one species disjunct to South America; ours perhaps adventive in southern Texas, eastern San Luis Potosí, and Colima.

REFERENCES: POWELL, A. M. 1969. Taxonomy of *Perityle* Benth. (Compositae-Peritylinae). I. Section *Pappothrix* A. Gray. *Rhodora* 71:58–93; ———. 1973. Taxonomy of *Perityle* section *Laphamia* (Compositae-Helenieae-Peritylinae). *Sida* 5:61–128; ———. 1974. Taxonomy of *Perityle* section *Perityle* (Compositae-Peritylinae). *Rhodora* 76:229–306.

1. *Perityle microglossa* Benth., Bot. voy.
Sulphur 119. 1845.

— TYPE: "Realejo" (protologue) or "San Blas, Nayarit" (Powell 1974), 1837, *R. B. Hinds s.n.* (K).

For full synonymy and discussion of typification, see Powell (1974).

ILLUSTRATION: none found.

Robust to delicate annuals, to 6 dm high; leaves mostly opposite, petioles mostly 5–15 mm long, blades palmately

nerved, variable, mostly deltate, often purplish, mostly 1–4 cm long, the distal smaller, margins coarsely toothed to palmately lobed, ciliate, faces usually viscid-puberulent, sometimes glabrescent, often glandular-punctate; heads in loose, corymbiform associations; peduncles mostly 1–4 cm long, often swollen and fistulose distally; involucre hemispheric, ca. 3 mm high; phyllaries ca. 21 in 1(–2) series, \pm equal, oblanceolate, carinate, glandular-puberulent; ray florets mostly 8–12, corollas white, laminae 1–2 mm long; disc florets ca. 30+, corollas yellow, ca. 1.5 mm long, lobes very short, deltate; cypselae black, compressed, oblong to elliptic, ca. 1.5 mm long, margins

callous, white, ciliate; pappi lacinate crowns to ca. 0.2 mm long plus 2 fine bristles to ca. 1 mm long; $2n = 34, 36, 68, 102$; flowering Oct–May.

Adventive (see Powell 1974) in Montane Rain, Tropical Deciduous, and Pine-Oak-*Liquidambar* forests and Savanna;

uncommon in Central Depression and Sierra Madre; 600–1500 m. Northwestern Mex. (Baja C.S., Son., Chih., Sin., Nay., Jal., Chis.). CHIAPAS COLLECTIONS: Calz 9918 (TEX); Ho 3491 (TEX); 24010; 24625A; 34320; 42876; 54045; 56316.

50. PERYMENIUM

Perymenium Schrad., Ind. sem. hort. Goett. 4. 1830; Linnaea 4: Lit. 73. 1831. — TYPE: *Perymenium discolor* Schrad.

Perennial herbs, scandent or erect shrubs, and small trees, to 20 m high; leaves opposite, petiolate to subsessile, blades mostly ovate-elliptic to lanceolate, sometimes linear, usually 3–5-nerved from near their bases, margins entire or serrate, faces often scabrellous, sometimes subglabrous or densely pilosulous to tomentose, the abaxial often dotted with resin globules; heads usually 3–7+ (rarely borne singly) in terminal and axillary, cymiform to subumbelliform clusters, the clusters often aggregated at ends of branches; peduncles often very slender, sometimes bracteolate; involucre cylindric, campanulate, or hemispheric, mostly 3–13 mm high; phyllaries mostly 9–15+ in 2–4 series, subequal or unequal (the outer shortest) and strongly imbricate, often basally indurate, distally herbaceous or membranous, sometimes distally ciliate; receptacles slightly convex to hemispheric; paleae scarious, navicular and infolding subtended florets, carinate, usually acute to acuminate, all but the outermost usually deciduous; ray florets 5–16, pistillate, fertile, corollas ochroleucous to bright yellow [orange], laminae narrowly obovate to linear-oblong; disc florets 8–150+, bisexual, fertile, corollas yellow, tubes cylindric, shorter than the abruptly dilated and cylindric, or gradually dilated and funnelform, throats, lobes 5, narrowly delatate to delatate-ovate, often papillate-hispidulous abaxially and papillate on adaxial margins; style branches slender, hirsutulous and attenuate distally; cypselae gray to blackish purple or reddish brown, obcompressed and trigonous (ray) or compressed and biconvex to tetragonous (disc), margins sometimes winged, the body proper cuneate to quadrate-oblong in outline, apically very shortly and obscurely rostrate, faces subglabrous to sparsely strigillose, usually transversely rugulose-striate, wings, margins, and shoulders commonly hispidulous or pilosulous; pappi soon falling, of 12–30, usually puberulent or barbellulate, terete or somewhat flattened setae or coarse bristles; $x = 15$.

About 36 species ranging from northwestern Mexico into Central America (Guat., Bel., Hond., Sal., Nic., C.R.) and South America (Col., Ecu., Peru).

REFERENCE: FAY, J. J. 1978. Revision of *Perymenium* (Asteraceae – Heliantheae) in Mexico and Central America. *Allertonia* 1:235–296.

- a. Cypselae narrowly but decidedly winged, wings often lacerate and prolonged as triangular, pappus-like appendages.
 - b. Involucre 5–12 mm high; ray corolla laminae 6–18 mm long; disc florets 25–60+ 4. *P. grande*
 - [bb. Involucre 3–4 mm high; ray corolla laminae 3.5–5 mm long; disc florets 20–28. — Not known from Chis. *P. gymnomoloides* (Less.) DC.]
- aa. Cypselae sometimes sharp-edged but not distinctly winged.
 - c. Inner phyllaries distally membranous, rounded, ciliate, contrasting with paleae.
 - d. Leaf blades whitened abaxially with appressed hairs; involucre hemispheric, 6–8 mm high; disc florets 40–60 5. *P. klattianum*
 - dd. Leaf blades green on both faces; involucre campanulate, 4–6 mm high; disc florets 9–19 . . . 3. *P. gracile*
 - cc. Inner phyllaries distally herbaceous to scarious, acute to obtuse, not strongly ciliate, most intergrading with paleae.
 - e. Ray florets 5, corolla laminae 3–4 mm long; disc florets ca. 8 6. *P. pinetorum*
 - ee. Ray florets 6–12, corolla laminae 4–13 mm long; disc florets 15–50.
 - f. Leaf blade lengths (2–)3–5 times widths; phyllary apices mostly squarrose or recurved 2. *P. ghiesbreghtii*
 - ff. Leaf blade lengths 1–2(–3) times widths; phyllary apices mostly erect 1. *P. chloroleucum*

1. *Perymenium chloroleucum* S. F. Blake, Brittonia 2:349. 1937.

— TYPE: Guatemala, Huehuetenango, Chiantla, “deep ravine,” 2165 m, 15 Dec 1934, A. F. Skutch 1966 (A).

ILLUSTRATION: none found.

Sprawling suffrutices or erect shrubs, to 2 m high; petioles mostly 3–12 mm long, leaf blades ovate to elliptic, typically

3-nerved from near their bases, 1.5–5 cm long, 9–27 mm wide, lengths 1–2(–3) times widths, bases cuneate-rounded to rounded-truncate, margins serrate to subentire, apices obtuse to acute, faces scabrellous; heads mostly in open or congested, corymbiform to subumbelliform clusters of 2–7; peduncles mostly 5–35 mm long; involucre campanulate to cylindric, 4–5(–6.5) mm high; phyllaries 12–15, the outer ovate-acute, distally herbaceous to scarious, acute to obtuse, not strongly ciliate, the inner lance-ovate, intergrading with paleae, all

subglabrous to appressed-puberulent, tips erect; paleae stramineous to greenish, 4–5 mm long, acuminate; ray florets 7–9, corollas yellow, tubes ca. 1 mm long, laminae linear-oblong, 4–9 mm long; disc florets 15–30, corollas yellow, tubes 0.6–1.3 mm long, throats narrowly funnelform, 2–2.5 mm long, lobes narrowly deltate, ca. 0.7 mm long; style branches ca. 1.3 mm long; cypselae blackish, not winged, 2.5–3 mm long; pappi of 16–20+ setae 1–2.5 mm long; $2n = 30$; flowering Sep–Jan.

Open or shrubby slopes in Pine-Oak-*Liquidambar* and Pine-Oak forests; common on Central Plateau, rare in Northern Highlands, Eastern Highlands, and Sierra Madre; 1100–2400 m. Southern Mex. (Chis.), Guat. CHIAPAS COLLECTIONS: *Crq* 10487 (DS, TEX); *GL* 234 (CAS, TEX); *M-I* 80 (CAS); *PM* 124 (CAS, TEX); *Sund* 2430 (TEX); 13134; 27636; 40743; 40986; 45967; 45968; 46061; 46391; 46529; 47014; 53068A.

Some D. E. Breedlove collections from some sites, especially at 900–1380 m on north side of central Sierra Madre, are intermediate between typical *P. chloroleucum* and *P. ghiesbreghtii*: 38568, 46250, 46529, 46673, 46747, and 54554.

2. *Perymenium ghiesbreghtii* B. L. Rob. & Greenm., Proc. Amer. Acad. Arts 34:525. 1899.

— TYPE: Mexico, Chiapas, “mountains,” 1864–1870, *A. B. Ghiesbreght* 576 (GH).

Perymenium charolepis B. L. Rob. & Greenm., Proc. Amer. Acad. Arts 34: 525. 1899. — TYPE: Mexico, Chiapas, “mountains,” Nov 1864–1870, *A. B. Ghiesbreght* 563 (GH; fragment: UC!).

Perymenium purpusii Brandegee, Univ. Calif. Publ. Bot. 3:395. 1914. — TYPE: Mexico, Chiapas, Cerro del Boquerón, Sep 1913, *C. A. Purpus* 6639 (UC!; isotypes: F, GH, MO, NY, US).

Perymenium leptopodum S. F. Blake, Proc. Amer. Acad. Arts 51:523. 1916. — TYPE: Guatemala, near Cobán, 1311 m, Jan 1879, *H. von Tuerckheim* “339” (K, fide Fay 1978; isotypes: BM, GH).

Perymenium inamoenum Standl. & Steyerl., Publ. Field Mus. Nat. Hist., Bot. Ser. 23:143. 1944. — TYPE: Guatemala, Zacapa, Sierra de las Minas, trail between Rio Hondo and summit of mountain at Finca Alejandra, pine-covered slopes, 1000–1500 m, 11 Oct 1939, *J. A. Steyermark* 29737 (F).

ILLUSTRATION: none found.

Sprawling suffrutescent or erect shrubs, to 3 m high (stems often purple-mottled); petioles mostly 7–15 mm long, leaf blades narrowly to broadly lanceolate (usually somewhat to strongly conduplicate), 3(–5)-nerved from near their bases, 4–8(2–12) cm long, 18–25(10–55) mm wide, lengths (2–)3–5 times widths, bases narrowly cuneate to truncate-rounded, margins subentire to coarsely serrate, apices acuminate to attenuate, faces scabrellous (the abaxial dotted with resin globules); heads (usually held well beyond the leaves) aggregated in terminal and axillary, cymiform to subumbelliform clusters of 3–5; peduncles (often bracteolate) 8–30(–80) mm long; involucre campanulate, mostly 3–5 mm high; phyllaries 12–15, strongly unequal, imbricate, intergrading with paleae, all lanceolate to lance-oblong, apices usually herbaceous, squarrose or recurved,

faces subglabrous or appressed-pubescent; paleae greenish-stramineous, 4–7.5 mm long, the tips acute to acuminate, often squarrose or recurved; ray florets 8(6–12), corollas bright yellow, tubes ca. 1.5 mm long, laminae narrowly obovate to linear-oblong, 4–9(–13) mm long; disc florets mostly 15–30(–50), corollas pale yellow, tubes ca. 1.5 mm long, throats gradually ampliate, narrowly funnelform, ca. 2.5 mm long, lobes narrowly deltate, ca. 0.7 mm long; style branches ca. 1.5 mm long; cypselae blackish, not winged, 2–3 mm long; pappi of 15–30+ setae 0.5–2.5(–4) mm long; $2n = 30$; flowering mostly Aug–Dec.

Steep, wooded or shrubby slopes and cliffs in Montane Rain, Evergreen Cloud, Pine-Oak-*Liquidambar*, and Pine-Oak forests; very common on Central Plateau and in adjacent Northern and Eastern highlands, less so in Sierra Madre; (670–)1200–3000 m. Southern Mex. (Chis.), Guat. CHIAPAS COLLECTIONS: *Br* 165 (TEX); *C&L* 601 (CAS); *C* 339 (DS); *C* 372 (DS); *Crq* 11217 (DS, LL); *GG* 249 (CAS, TEX); *GG* 339 (CAS, TEX); *Kim* 10041 (TEX); *EL* 5144 (DS); *La* 1806 (DS); *La* 2337 (DS); *La* 2915 (DS); *EWN* 3205 (DS); *P* 6639 (F, GH, MO, NY, UC, US); *RM* 419 (CAS); *RM* 569 (CAS); *SC* 253 (CAS, TEX); *T&L* 41180 (DS); *T* 506 (DS, LL); *T* 1026 (DS, LL); *T* 1325 (DS); *T* 1333 (DS); *T* 1636 (DS, LL); *T* 1728 (DS); *T* 1787 (DS, LL); *T* 1871 (DS); *T* 1918 (DS); *T* 2425 (DS); *T* 2848 (DS, LL); *T* 3349 (DS, LL); *T* 9295 (TEX); *BLT* 15460 (TEX); *Vi* 825 (TEX); *Z* 115 (DS); *Z* 268 (DS, LL); *Z* 558 (DS); 6911; 7126; 7351; 7508; 12364; 12668; 12973; 13731; 13760; 13951; 14161; 21161; 25877; 27782; 29465; 29540; 36956; 37330; 38901; 40286; 40798; 40887; 41268; 41333; 42738; 45987; 46194; 46297; 46348; 48448; 48851; 49284; 52652; 53175; 53884; 55992; 65683; 65699; 66070; 68582; 69876; 70460.

3. *Perymenium gracile* Hemsl. in F. Godman and O. Salvin, Biol. cent.-amer. Bot. 2:181. 1881.

— TYPE: Mexico, “San Cristobal, Orizaba,” *E. Bourgeau* 3206 (K; isotypes: F, US).

Perymenium microcephalum Schultz-Bip., Leopoldina 23: 143. 1887. — LECTOTYPE: (Fay 1978): Mexico, Oaxaca, Sta. Talca [Talea], Aug 1842, *F. M. Liebmann* “374” (C; isolectotypes: C, GH, US).

ILLUSTRATION: none found.

Shrubs or suffrutescent, to 1+ m high; petioles 8–17 mm long, leaf blades lance-ovate to ovate, usually prominently 3-nerved from near their bases to their tips, 3–8 cm long, 15–35 mm wide, length ca. 2 times width, bases rounded, margins subentire or serrate, apices acute to acuminate, faces strigillose; heads mostly in terminal and axillary, cymiform clusters of 20–30; peduncles mostly 3–15 mm long; involucre cylindric-campanulate, 4–6 mm high; phyllaries 12–15, strongly unequal, imbricate, the outer ovate, the inner more oblong, all proximally indurate, distally membranous and ciliolate, contrasting with paleae; paleae stramineous, 4–4.5 mm long, acute; ray florets 5–8, corollas yellow (? ochroleucous), tubes ca. 1 mm long, laminae narrowly obovate to oblong, 6–9 mm long; disc florets 9–19, corollas yellow, tubes 1–1.5 mm long, throats narrowly funnelform to cylindric, 2–2.5 mm long, lobes deltate, ca. 0.5 mm long; style branches ca. 1 mm long; cypselae blackish, not

winged, 2–2.5 mm long; pappi of ca. 20 setae 0.5–2.5 mm long; flowering Jun, Aug.

In Pine-Oak Forest; rare in Sierra Madre; elevation unknown. Southern Mex. (Oax., Chis.), Guat. CHIAPAS COLLECTION: *He 1113* (CAS, TEX).

4. *Perymenium grande* Hemsl. in F. Godman and O. Salvin, Biol. cent.-amer. Bot. 2:181. 1881.

— TYPE: Guatemala, Alta Verapaz, "on mountains around Cobán," 4300 ft., Jan 1879, *H. von Tuerckheim* "336" (K; isotypes: F, GH, MO, NY, US).

Shrubs or small trees, to 10(–20) m high; petioles 1–5+ cm long (hirsutulous to tomentose), leaf blades lanceolate to ovate or deltate, often prominently 3(–5)-nerved from near their bases, mostly 7–15(–26) cm long, 4–10 cm wide, bases broadly cuneate to truncate or cordate, margins serrate, apices acute to acuminate, abaxial faces strigillose to pilose or tomentose, adaxial faces scabrelous; heads typically in terminal and axillary, compact to open, corymbiform to paniculiform clusters of 3–6–15; peduncles mostly 1–5 cm long; involucre broadly campanulate to hemispheric, 5–12 mm high; phyllaries 12–15, unequal, the outer rotund to ovate to lanceolate, the inner more oblong, all usually ciliolate about the apex, contrasting with paleae; paleae stramineous, mostly 5–8 mm long; ray florets 8(5–12), corollas yellow to yellow-orange, tubes 1.5–2.5 mm long, laminae ovate to linear-oblong, 6–18 mm long; disc florets 25–60+, corollas yellow, tubes 1.2–2.3+ mm long, throats slightly dilated, cylindric, 2. 1–3.3 mm long, lobes narrowly triangular, 0.5–0.9 mm long; style branches 1.3–1.8 mm long; cypselae blackish to slate gray, narrowly winged, the wings often extended into erose to lacerate, triangular to attenuate, pappus-like appendages, cypselae bodies 2.5–4.5 mm long excluding wings; pappi of 12–15+ setae 1–4 mm long.

Fay (1978) recognized two varieties; both are found in Chiapas:

4a. *Perymenium grande* Hemsl. var. *grande*.

Perymenium tuerckheimii Klatt, Leopoldina 29:95. 1884. —

TYPE: Guatemala, Alta Verapaz, "in montibus circa Cobán," 4300 ft. [1310 m], Jan 1879, *H. von Tuerckheim* "336" (GH; isotypes: F, K, MO, NY, US).

ILLUSTRATION: Fig. 35.

Involucre 4.5–6 mm high; paleae 5–6 mm long; ray laminae 5–13 mm long; disc florets mostly fewer than 30; disc cypselae mostly ca. 3 mm long; flowering Dec.

Wooded slopes in Montane Rain and Pine-Oak forests; infrequent in E Sierra Madre; 1250–1900 m. Southern Mex. (Chis.), Guat., Hond., Salv. CHIAPAS COLLECTIONS: *3108i*; *42484*.

4b. *Perymenium grande* Hemsl. var. *nelsonii* (B. L. Rob. & Greenm.) Fay, Phytologia 31:16. 1975.

— *Perymenium nelsonii* B. L. Rob. & Greenm., Proc. Amer. Acad. Arts 34:529. 1899. — LECTOTYPE: (Fay 1975:247): Mexico, Chiapas, between San Cristóbal de Las Casas and Teopisca, 2050–2600 m, 4 Dec 1895, *E. W. Nelson* 3465 (GH; isotype: US).

Perymenium latisquamum S. F. Blake, Contr. U.S. Natl. Herb. 22:626. 1924. — TYPE: Mexico, Chiapas, Sierra de Tonalá, Sep 1913, *C. A. Purpus* 6647 (GH; isotype: UC!).

ILLUSTRATION: none found.

Involucre 7–12 mm high; paleae 6–8 mm long; ray laminae 9–18 mm long; disc florets mostly more than 30; disc cypselae 3.5–4.5 mm long; $2n =$ ca. 90, ca. 172; flowering Jun–Dec.

Shrubby or forested slopes in Montane Rain, Evergreen Cloud, Seasonal Evergreen, Tropical Deciduous, Pine-Oak-Liquidambar, and Pine-Oak forests; common on Central Plateau and in Central Depression, less so in Northern Highlands and Sierra Madre; 488–2500 m. Southern Mex. (Chis.), Guat., Hond., Salv., Nic., C.R. CHIAPAS COLLECTIONS: *Crq 9676* (TEX); *Crq 10460* (DS, TEX); *Crq 10465* (DS, TEX); *Crq 10478* (DS, TEX); *GL 197* (TEX); *GL 629* (TEX); *H&F 4183* (TEX); *Huft 2274* (TEX); *Jks 7118* (TEX); *La 1545* (DS); *La 1945* (DS); *La 2442* (DS); *La 2545* (DS); *La 2644* (DS); *Lo 156* (CAS, TEX); *EM 1663* (LL); *EWN 3076* (GH, US); *EWN 3465* (GH, US); *Pa 288* (CAS); *P 6647* (GH, UC); *P 9073* (DS, MO, UC); *P 9110* (UC); *S&S 2970* (GH, US); *T 1462* (DS); *T 2705* (DS, LL); *T 2973* (DS); *T 3093* (DS, LL); *T 9334* (TEX); *T 9395* (CAS, TEX); *Urb 3332* (TEX); *7082*; *10386*; *12086*; *12171*; *12409*; *13111*; *13267*; *13277*; *13395*; *13462*; *13799*; *14083*; *14503*; *19821*; *19861*; *20115*; *26162*; *27176*; *27628*; *28005*; *28595*; *28936*; *37421*; *39716*; *41210*; *42258*; *44452*; *45969*; *46161*; *46235*; *46338*; *46425*; *46501*; *46987*; *52921*; *53118*; *55719*; *64904*; *69829*; *71078*.

5. *Perymenium klattianum* Fay, Allertonia 1:260. 1978.

— TYPE: Mexico, Veracruz, Orizaba, May 1905, *C. A. Purpus* 1163 (NY; isotypes: F, MO, UC!).

ILLUSTRATION: none found.

Shrubs or suffrutes, to 2 m high; petioles 3–8 mm long, leaf blades lanceolate to ovate, usually prominently 3(–5)-nerved from near their bases to their tips, 3–8 cm long, 8–25 mm wide, lengths 3–4 times widths, bases cuneate to rounded or truncate, margins entire (or serrate), apices acute to acuminate, abaxial faces whitened with appressed, coarse, straight, and finer, crisped, hairs, adaxial faces scabrelous; heads mostly 3–5 in terminal and axillary, cymiform clusters; peduncles mostly 3–15 mm long; involucre broadly hemispheric, 6–8 mm high; phyllaries 12–15, strongly unequal and imbricate, the outer rotund to ovate, the inner more oblong, intergrading with paleae, all sparsely appressed-pubescent, proximally indurate, distally membranous and ciliolate; paleae stramineous, 4–5 mm long, acute; ray florets 9–12, corollas yellow (? ochroleucous), tubes ca. 1 mm long, laminae narrowly obovate to oblong, 5(–8) mm long; disc florets 40–60, corollas yellow, tubes ca. 1 mm long, throats narrowly funnelliform to cylindric, ca. 2 mm long, lobes lance-deltate, ca. 0.5 mm long; style branches ca. 1 mm long; cypselae blackish, not winged, ca. 2.5 mm long; pappi of ca. 15 setae 0.5–2.5 mm long.

In Chiapas: Mt. Ovando, SE Sierra Madre, 17 Dec 1936, E. Matuda 783 (MICH, TEX, US); otherwise known only from vicinity of Orizaba, Veracruz.

6. *Perymenium pinetorum* Brandegee, Univ. Calif. Publ. Bot. 10:420. 1924.

— TYPE: Mexico, Chiapas, near "Hacienda Monserrate" [Montserrate], pine forests, Sep 1923, C. A. Purpus 9072 (UC!; isotypes: DS!, F, GH, MEXU, MO, NY, US).

ILLUSTRATION: none found.

Shrubs, stature unknown; petioles 3–8 mm long, leaf blades lanceolate to lance-ovate, mostly 25–45 mm long, 8–25 mm wide, bases rounded-cuneate to nearly truncate, margins toothed, apices acute, faces scabrellous; heads mostly in clusters of 3–7 at ends of branches; peduncles 2–5+ mm long; involucre campanulate to hemispheric, ca. 4 mm high; phyllaries 9–15, strongly unequal and imbricate, the outer lance-ovate, the inner oblanceolate, intergrading with paleae, all finely ap-

pressed-puberulent; paleae stramineous, 4–5 mm long, acute to attenuate; ray florets 5, corollas yellow, tubes ca. 0.5 mm long, laminae 3–4 mm long; disc florets ca. 8, corollas yellow, tubes ca. 0.6 mm long, throats dilated, cylindric, ca. 2 mm long, lobes lance-deltate, ca. 0.6 mm long; style branches ca. 0.8 mm long; cypselae blackish to reddish brown, not winged, ca. 2 mm long (faces glabrous or, distally, minutely pilose, margins ciliate, at least distally); pappi of 12–15 setae 0.5–2.5 mm long; flowering Jun–Sep.

Chiapas endemic: Pine-Oak Forest in W Sierra Madre. CHIAPAS COLLECTIONS: *P* 345 (GH); *P* 9072 (DS, F, GH, MEXU, MO, NY, UC, US); *P* 10245 (MICH, UC, US).

Taxon to be looked for in Chiapas:

***Perymenium gymnomoloides* (Less.) DC.** — Mex. (S.L.P., Pue., Ver., Camp.) and C.A. (Guat., Bel.). See couplet b/bb in key.

51. PHILACTIS

Philactis Schrad., Index. Sem. Hort. Goett. 1831; Linnaea 8: Litt. 24. 1833. — TYPE: *Philactis zinniioides* Schrad.

Grypocarpa Greenm. in C. S. Sargent, Trees and shrubs 1:145. 1903. — TYPE: *Grypocarpa nelsonii* Greenm. = *Philactis zinniioides* Schrad.

Sanvitaliopsis Schultz-Bip. ex Greenm., Proc. Amer. Acad. Arts 41:260. 1905., nom. superfl. = *Sanvitaliopsis* Schultz-Bip. ex Benth. in G. Benth. and J. D. Hooker, Gen. pl. 2:357. 1873. pro syn., illegit.; similiter Klatt, Leopoldina 23:89. 1887. — TYPE: *Sanvitaliopsis liebmanni* (Klatt) Greenm., illegit. = *Zinnia liebmanni* Klatt = *Philactis zinniioides* Schrad.

Shrubs, to 15+ dm high; leaves opposite, petiolate, blades broadly lanceolate to deltate, margins serrate, faces glabrous or scabrellous; heads borne singly or in simple to compound, cymiform clusters of 2–5(–7+); peduncles stout to slender; involucre broadly hemispheric, 6–9 mm high; phyllaries 3–4-seriate, strongly imbricate, the outermost often herbaceous-foliaceous at tips, the others chartaceous to indurate, lance-acuminate, all ± densely strigillose, sometimes glabrescent; receptacles broadly to narrowly conical; paleae navicular, carinate, apically indurate and subulate-tipped; ray florets 8–16, pistillate, fertile, corollas greenish yellow to orange, sometimes drying darker, marcescent, "tubes" open to base adaxially; disc florets 60–100+, bisexual, fertile, corollas ochroleucous to greenish yellow or orange, sometimes purplish distally, stoutly cylindric, tubes much shorter than throats, walls of tubes and lower throats much thickened and fleshy, lobes 5, equal, rounded-deltate, glabrous throughout; styles globose-dilated near bases, branches stout, slightly hispidulous-dilated at tips; cypselae stramineous to brown, 3–4-angled and obpyramidal to subterete or weakly flattened, glabrous or sparsely hairy; pappi of 0–4 subulate awns; $x = 14$.

Monotypic; very closely related to *Heliopsis* and through it to *Tehuana* and *Zinnia*.

REFERENCES: BLAKE, S. F. 1930. Contr. U.S. Natl. Herb. 20:240–241; TORRES, A. M. 1969. Revision of the genus *Philactis* (Compositae). Brittonia 21:322–331. — 1972. *Philactis fayi* (Compositae): A new species from Mexico. Brittonia 24:90–92.

1. *Philactis zinniioides* Schrad., Index Sem. Hort. Goett. 1831; Linnaea 8: Litt. 24. 1833.

— TYPE: Grown in Goettingen; seed sent from Mexico by Spangenberg (LE?). Blake (1930) referred to an "authentic" specimen in G-DC (microfiche!) sent to de Candolle by Schrader.

Zinnia liebmanni Klatt, Leopoldina 23:89. 1887. — *Sanvitaliopsis liebmanni* Schultz-Bip. ex Klatt, loc. cit., pro syn., illegit. — *Sanvitaliopsis liebmanni* (Klatt) Greenm., Proc. Amer. Acad. Arts 41: 261. 1905. illegit., nom. gen. superfl. — *Grypocarpa liebmanni* (Klatt) S. F. Blake, Contr. Gray Herb. 52:35. 1917. — *Philactis liebmanni* (Klatt) S. F. Blake, Contr. U.S. Natl. Herb. 26:240. 1930.

— TYPE: Mexico, Oaxaca, "Rio Tabá" (Rio Tabá, *vide* Torres, 1969), *F. M. Liebmann s.n.* [552] (C; isotype: US, fragment; drawing by Klatt, GH, tracing of holotype?).

Grypocarpa nelsonii Greenm. in C. S. Sargent, Trees and shrubs 1:145, pl. 73. 1903. — *Sanvitaliopsis nelsonii* (Greenm.) Greenm., Proc. Amer. Acad. Arts 41:261. 1905. illegit., nom. gen. superfl. — *Philactis nelsonii* (Greenm.) S. F. Blake, Contr. U.S. Natl. Herb. 26:241. 1930. — TYPE: Mexico, Chiapas, top of ridge back of Tonalá, 10 Aug 1895, E. W. Nelson 2892 (GH).

Grypocarpa hebeclada S. F. Blake, Contr. Gray Herb. 52:35. 1917. — TYPE: Mexico, "Oaxaca" (Hidalgo?), hills near Tula, 20 May 1906, C. G. Pringle 13863 (GH; isotype: UC!).

Melanthera fruticosa Brandegee, Univ. Calif. Publ. Bot. 10:421. 1924. — TYPE: Mexico, Chiapas, "along the road between Tuxtla Gutiérrez and Jalisco" (= Arriaga), Sep 1923, C. A. Purpus 9117 (UC!).

Philactis fayi Torres, Brittonia 24:90. 1972. — TYPE: Mexico, Michoacán, ca. 35 km southeast of Jiquilpan de Juárez and 14 km southeast of Cotija, 1800 m, 15 Oct 1970, A. Cronquist 10803 with J. Fay (NY; isotypes: CAS!, DUKE, F, GH, KANU, MEXU, MICH, MSU, S, TEX, US, UTC).

ILLUSTRATIONS: Fig. 36; Sargent, G. S. 1903. Trees and Shrubs, vol. 1, pl. 73.

Shrubs, to 1+ m high; leaf blades deltate to trullate or lance-rhombic, mostly 4–9 cm long, 2–4(–7) cm wide, margins coarsely dentate; peduncles 12–45(5–80) mm long; phyllaries ca. 25–35, 6–9(–12) mm long; paleae stramineous, equalling to surpassing disc florets; laminae of ray corollas linear to oblong, (5–)9–12 mm long; disc corollas 2.5–4.6 mm long, tubes 0.5–1.1 mm long, throats ca. 2 mm, lobes deltate, 0.5–0.9 mm;

ray cypselae triquetrous, 1.5–3.2 mm long; disc cypselae 3–4-angled, obpyramidal to subterete or somewhat flattened, 1.8–2.8 mm long; pappi none or ray cypselae each with 1 stout, subulate awn from adaxial shoulder, disc cypselae each with 1–4 similar, stout awns to 3 mm long; $2n = 28, 56, 84$; flowering mostly Jul–Nov.

Open, disturbed places along roads and streams in Evergreen Seasonal and Tropical Deciduous forests; uncommon in S Northern Highlands, in Central Depression, and on upper Pacific Coastal Plain in W half of Chis.; 700–1400 m. Mex. (Hgo.?, Mich., Oax., Chis.), Guat. CHIAPAS COLLECTIONS: *Crq* 9670 (TEX); *Crq* 10492 (DS); *H&F* 4184 (TEX); *RMK* 2748 (UC); *RMK* 2878 (DS, TEX, UC); *RMK* 3446 (DS, TEX, UC); *EWN* 2892 (GH); *Rz* 33640 (CAS); *P* 9117 (UC); *Seig* 9786 (LL); *Stu* 630 (TEX); *Urb* 3343 (TEX); *We* 17827 (UC); 10659; 13385; 13720; 21565; 28267; 36734; 37158; 39625; 47018; 51971; 64903; 70044; 70924.

52. PODACHAENIUM

Podachaenium Benth., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 4(1852):98. 1853. — TYPE: *Podachaenium paniculatum* Benth. = *Ferdinanda eminens* Lag. = *Podachaenium eminens* (Lag.) Schultz-Bip.

Altamirania Greenm., Proc. Amer. Acad. Arts 39:106. 1903. — TYPE: *Altamirania pachyphylla* Greenm. = *Podachaenium pachyphyllum* (Schultz-Bip. ex Klatt) R. K. Jansen, N. A. Harriman, & Urbatsch.

Aspiliopsis Greenm., Contr. Gray Herb., n.s. 25: suppl. leaflet, unpag., 25 Sep 1903. — TYPE: *Aspiliopsis pachyphylla* (Greenm.) Greenm. = *Altamirania pachyphylla* Greenm. = *Podachaenium pachyphyllum* (Schultz-Bip. ex Klatt) R. K. Jansen, N. A. Harriman, & Urbatsch.

Shrubs or trees, to 10 m high; leaves opposite, petiolate, blades usually to 15–30+ cm long, pentagonal or oblong-elliptic to lanceolate, faces hirtellous to tomentose or glabrous; heads 30–60(–90) in corymbiform to paniculiform masses at ends of branches; peduncles slender, often bracteolate, tomentose or sparsely pilose; involucre saucerlike, ca. 6–10 mm diam.; phyllaries 16–25, 3–4-seriate, unequal, strongly imbricate, soon reflexed; receptacles subhemispheric to rounded-conical; paleae shorter than florets at anthesis, somewhat larger in fruit, becoming chartaceous, navicular and weakly keeled; ray florets 8–21+, pistillate, fertile, corollas white, tubes pilose, laminae narrowly obovate or spatulate, showy, often abaxially dotted with minute resin globules; disc florets 100–150+, bisexual, fertile, corollas ochroleucous to yellowish, distally yellow or purplish, tubes pilose and/or glandular-puberulent, or glabrous, shorter than the campanulate throats, lobes 5, deltate to ovate, abaxially dotted with resin globules; style branches narrowly spatulate, minutely hirsutulous, scarcely appendaged; cypselae blackish with paler margins and bases, proximally attenuate and somewhat winged-stipitate, laterally flattened or compressed or obscurely triquetrous distally, margins ciliate; pappi none or of 2(1–3 in ray cypselae), lanceolate to subulate, fimbriate to subplumose squamellae plus 1–8, shorter, erose scales; $x = 19$.

Two to four species in southern Mexico (Oax., Chis.) and Central America (Guat., Bel. to C.R.).

REFERENCES: JANSEN, R. K., N. A. HARRIMAN, and L. H. URBATSCH. 1982. *Squamopappus* gen. nov. and redefinition of *Podachaenium* (Compositae: Heliantheae). Syst. Bot. 7:476–483; TURNER, B. L. and J. L. PANERO. 1992. New species and combinations in *Podachaenium* (Asteraceae, Heliantheae). Phytologia 73:143–148.

- a. Leaves mostly pentagonal, abaxially densely tomentose; phyllaries ca. 25, tomentose to subvillous; ray corolla laminae usually 10–15 mm long. 2. *P. eminens*
- aa. Leaves mostly oblong-elliptic to lanceolate, abaxially nearly glabrous; phyllaries 30–40+, hirtellous or nearly glabrous; ray corolla laminae usually 14–20+ mm long. 1. *P. chiapanum*

1. *Podachaenium chiapanum* B. L. Turner & Panero, Phytologia 73:144. 1992.

— TYPE: Mexico, Chiapas, Mpio. Jaltenango, Reserva El Triunfo, 2200 m, 12 Jun 1990, M. Heath and A. Long 956 (TEX; isotype: CAS!).

ILLUSTRATION: Phytologia 73:147. 1992.

Coarse herbs or shrubs to 5 m high, stems not winged; petioles 2–6 cm long, blades elliptic-ovate to lanceolate, obscurely triplinerved or pinnately nerved, 10–20 cm long, 20–75 mm wide, bases broadly to narrowly cuneate, somewhat decurrent onto petioles, margins remotely toothed, apices attenuate to long-acuminate, abaxial faces sparsely and minutely appressed-pubescent, nearly glabrous, adaxial faces the same; heads 10–20+ in corymbiform associations 10–20 cm across;

peduncles 10–60 mm long, sparsely to densely hirsute with rusty, septate hairs; involucre saucer-shaped, 12–20+ mm diam.; phyllaries 30–40+, linear 6–10 mm long, hirtellous or nearly glabrous; paleae lance-navicular, 3.5–4 mm long, weakly carinate; ray florets 20–30, corollas with hirsutulous tubes ca. 1 mm long, laminae \pm linear, 14–20+ mm long; disc florets 100–200+, corollas yellowish to orange, 2–3 mm long, tubes 0.3–0.5 mm long, pubescent, throats funnelform, 1.4–2 mm long, lobes deltate-ovate, 0.3–0.6 mm long; style branches 0.8 mm long; cypselae 3-angled (ray) or flattened, ca. 2 mm long, glabrous or distally sparsely hairy; pappi of 2 (1–3 in ray cypselae) lance-subulate squamellae ca. 1 mm long plus 1–4 much shorter, erose scales flowering Apr–Jun; Nov–Dec.

Chiapas endemic: Evergreen Cloud Forest; rare or uncommon in Sierra Madre; 1900–2600 m. CHIAPAS COLLECTIONS: *Cz 8776* (TEX); *He MA14* (TEX); *He 956* (CAS, TEX); *RM 505* (CAS); 42726; 66021; 72687.

2. *Podachaenium eminens* (Lag.) Schultz-Bip., *Flora* 44:557. 1861.

— *Ferdinanda eminens* Lag., Gen. sp. pl. 31. 1816. — TYPE: "Habitat in Nova Hispania" (?MA).

Podachaenium paniculatum Benth. in Oersted, Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 4(1852):99. 1853. — TYPE: Costa Rica, Volcán Irazú, A. S. Oersted s.n. (?K).

ILLUSTRATION: Fig. 37.

Shrubs or trees, to 3(–10) m high; petioles 6–10(–15) cm long, somewhat winged distally, blades usually pentagonal to

ovate, strongly 3(–5)-nerved from near their bases, commonly 20–30 cm long, 20–30 cm wide, abaxial faces tomentose (often almost feltlike), adaxial faces hirtellous to tomentose; heads 30–50(–90) in paniculiform or corymbiform associations; peduncles mostly 2–5 cm long, usually tomentose; phyllaries ca. 25, lanceolate to lance-linear, mostly 1–4 mm long, sparsely tomentose to subvillous, often obscurely ciliolate and with minute, sessile resin globules; paleae ca. 3 mm long, distally similar to inner phyllaries; ray florets 12–21+, corollas with hirsutulous tubes ca. 1 mm long, laminae 10–15 mm long; disc florets ca. 150+, corollas yellowish to orange, tubes constricted distally, ca. 0.5–0.8 mm long, pilose, throats campanulate, ca. 1 mm long, lobes deltate, ca. 0.3 mm long, abaxially dotted with resin globules; style branches ca. 0.8 mm long; cypselae ca. 2 mm long overall; pappi none or of 2(1–3) lance-subulate squamellae ca. 1.5 mm long plus 1–8, shorter, erose scales; $2n = 38$; flowering Dec–Apr.

Remote slopes and weedy roadsides in Montane Rain, Evergreen Cloud, Evergreen Seasonal, and Pine-Oak-Liquidambar forests; uncommon in Northern and Eastern highlands, on Central Plateau, in Central Depression, and in E Sierra Madre; 300–2600 m. Mex. (Sin., Jal., Ver., Oax., Chis.), Guat., Bel., Hond., Salv., Nic., C.R. CHIAPAS COLLECTIONS: *C 192* (DS); *Den 1671* (DS); *Gar 583* (CAS, TEX); *L 487* (DS); *Mz 17811* (CAS); *Lu 17807* (LL); *Mz 19378* (CAS); *EM 5182* (DS, LL); *GQ 3495* (DS, LL); *EM 5313* (LL); *EM 6104* (LL); *Neff 93-4-19-5* (TEX); *P 7191* (UC); *P 7724* (UC); *T 3965* (DS, LL); *Z 619* (DS); 8859; 9041; 15430; 31084; 32724; 33627; 33769; 34572; 42825; 50214; 50414; 50845 69101; 70497.

53. POROPHYLLUM

Porophyllum Guett., Hist. Acad. Roy. Sci. Mém. Math. Phys. (Paris 4°) 1750:377. 1754. — TYPE: *Porophyllum ruderales* (Jacq.) Cass. \equiv *Kleinia ruderalis* Jacq. = *Cacalia porophyllum* L. For fuller synonymy, see Keil (1975).

Strongly scented, mostly perennial herbs and shrubs, some annuals, mostly glabrous, often glaucous; leaves opposite or alternate, simple, blades orbicular to linear, margins entire to crenate, faces usually bearing conspicuous, oil-filled, pellucid glands; heads pedunculate, borne singly or in cymiform to paniculiform clusters; calyculus none; involucre mostly tubular-campanulate to turbinate, 5–25 mm high; phyllaries 5–10 in 1 series, lance-linear to broadly obovate, free nearly or quite to base, reflexed in fruit, usually beset with round to linear, pellucid glands; receptacles flat to conic-rounded, shallowly pitted; paleae none; ray florets none; disc florets 10–50(–100), corollas ochroleucous to yellow, brown, or purple, tubes very slender and much longer than the funnelform throats (sect. *Porophyllum*) or tubes much shorter than the narrowly cylindric throats [sect. *Hunteria* (Moc. & Sessé) DC.], lobes 5, often unequal; style branches apically narrowed and hispidulous distally, appendaged or stigmatic quite to tips; cypselae usually blackish, slender, fusiform to cylindric, striate, usually hirtellous to villous, rarely glabrous; pappi of 25–50(–100), fine to coarse, unequal, usually scabrellous, bristles, all free to their bases; $x = 11, 12, 15$.

About 25–30 species in wet, mesic, or xeric habitats; southwestern United States (Nev., Calif., Ariz., Tex.) south through Baja California Peninsula and mainland Mexico to Antilles, Central America, and South America (Col., Ven., Ecu., Peru, Bol., Braz.).

REFERENCES: JOHNSON, R. R. 1969. Monograph of the plant genus *Porophyllum* (Compositae: Helenieae). Univ. Kansas Sci. Bull. 48:225–267; KEIL, D. J. 1975. Tageteae in Flora of Panama. Ann. Missouri Bot. Gard. 62:1220–1241; RYDBERG, P. A. 1916. *Porophyllum*. In N. L. Britton et al., N. Amer. Fl. 34:181–193.

- a. Delicate to robust annuals; involucre 15–25 mm high.
 - b. Plants mostly less than 6 dm high; florets 12–15 per head; cypselae ca. 7 mm long 2. *P. pringlei*
 - bb. Plants (5–)10–15 dm high; florets 30–80+ per head; cypselae 9–12 mm long 4. *P. ruderales*
- aa. Shrubs or suffrutices; involucre 8–12 mm high.

- c. Leaf blades ovate to broadly elliptic, lengths mostly 1–2 times widths; heads loosely cymiform-clustered, often nodding on terete to clavate peduncles 1–2(–3) cm long; florets mostly 10–20 per head . 3. *P. punctatum*
 cc. Leaf blades mostly narrowly obovate, length (2–)3–6 times width; heads mostly borne singly, erect, on \pm terete peduncles 2–4 cm long; florets mostly 15–30 per head 1. *P. nelsonii*

1. *Porophyllum nelsonii* Greenm., Proc. Amer. Acad. Arts 32:32. 1896.

— LECTOTYPE: (here designated): Mexico, Oaxaca, "between Panixtlahuaca and Jaquila," 26 Feb 1895, *E. W. Nelson* 2399 (GH).

ILLUSTRATION: none found.

Shrubs, to 6(+?) dm high; leaves mostly opposite, petiolate, blades narrowly obovate to elliptic [lengths (2–)3–6 times widths], 15–30 mm long, each bearing 0–1 subapical and 0–6 submarginal, pellucid glands; heads borne singly, erect on \pm terete peduncles 2–4 cm long; involucre broadly campanulate to cylindric, 8–12 mm high; phyllaries 5, purplish, linear-oblong, somewhat glaucous, usually each bearing 4–6 linear, pellucid glands; florets mostly 15–30, corollas ochroleucous, tinged with purple distally, 5–8 mm long, tubes very slender, much longer than the funnelliform, somewhat geniculate throats, lobes lance-linear; cypselae slender, fusiform, 5–7 mm long, hirtellous; pappi of ca. 30, tawny to purplish, scabrellous, subequal bristles to 6 mm long; $2n = 24$; flowering mostly Oct.

Wooded slopes in Evergreen Seasonal, Tropical Deciduous, and Pine-Oak forests; uncommon in Northern Highlands, Central Depression (vicinity of Tuxtla Gutiérrez), and Sierra Madre; 600–1100 m. Southern Mexico (Oax., Chis.) CHIAPAS COLLECTIONS: 13529; 13836; 20088; 20496; 46595; 46771; 48016; 51127; 54139.

Johnson (1969) included *Porophyllum nelsonii* within his circumscription of *P. punctatum*.

2. *Porophyllum pringlei* B. L. Rob., Proc. Amer. Acad. Arts 27:178. 1893.

— LECTOTYPE: (McVaugh 1984:795): Mexico, Jalisco, "barranca near Guadalajara," Sep 1889, *C. G. Pringle* 2954 (GH).

ILLUSTRATION: none found.

Erect annuals, to 6 dm high; leaves opposite or alternate, petioles slender, to 24 mm long, blades elliptic to obovate (thin), mostly 2–4 cm long, sometimes glaucous, each bearing 0–7 marginal to submarginal pellucid glands; heads erect, borne singly or loosely cymiform-clustered on peduncles 1–3 cm long; involucre very narrowly cylindric, 15–18 mm high; phyllaries 5, narrowly linear, scarious-margined, each bearing 0–3 pellucid glands in 1 row; florets 12–15, corollas ochroleucous, 7–10 mm long, tubes very slender, 4–5+ times longer than the funnelliform throats, lobes lance-linear; cypselae slender, fusiform, ca. 7 mm long, hirtellous; pappi of ca. 30, tawny, fine, unequal bristles to 8 mm long; flowering mostly Oct.

Wooded slopes and along streams in Evergreen Seasonal, Tropical Deciduous, and Pine-Oak forests; uncommon in Central Depression; 750–1500 m. Southern Mexico (Jal., Mex., Gro., Chis.). CHIAPAS COLLECTIONS: 13355; 13863; 41160; 53744; 53802; 54479; 56854 70834.

Specimens of *Porophyllum calcicola* B. L. Rob. & Greenm. seem to be very closely related to specimens of *P. pringlei*; types of the two names may be conspecific.

3. *Porophyllum punctatum* (Mill.) S. F. Blake, Contr. Gray Herb., n.s. 52:58. 1917.

— *Eupatorium punctatum* Mill., Gardn. Dict., ed. 8. no. 11. 1768. — TYPE: Mexico, probably Veracruz, *W. Hous-toun* s.n. (BM, see Blake loc. cit.)

Porophyllum nummularium DC., Prodr. 5:649. 1836. — TYPE: Mexico, Oaxaca, "Tehuantepec et loc. vicin.," *L. Alaman* s.n. (G-DC, microfiche!).

Porophyllum ervendbergii A. Gray, Proc. Amer. Acad. Arts 19:35. 1883. — TYPE: Mexico, Tamaulipas, Wartenberg, *L. C. Ervendberg* 75 (GH).

Porophyllum millspaughii B. L. Rob., Publ. Field Columbian Mus., Bot. Ser. 2:109. 1900. — TYPE: Mexico, Yucatán, Progreso, 5 Mar 1899, *C. F. Millspaugh* 1648. (F; isotype GH).

Porophyllum guatemalense Rydb. in N. L. Britton et al., N. Amer. fl. 34:190. 1916. — TYPE: Guatemala, "near Newton" (Nentón, Huehuetenango, *fide* Williams in Fl. Guat.), 1895, *E. W. Nelson* 3523 (US).

Porophyllum pittieri Rydb. in N. L. Britton et al., N. Amer. fl. 34: 188. 1916. — TYPE: Guatemala, "Cuesta de Quilla, near Purulha, Baja Verapaz," 1905, *H. Pittier* 146 (US).

ILLUSTRATION: Fig. 38.

Erect to sprawling, suffrutescent to shrubby perennials (annuals?), to 2(–4?) m high; leaves mostly opposite, petioles slender, to 1 cm long, blades ovate to broadly elliptic (lengths mostly 1–2 times widths), mostly 9–20(–30) mm long, bearing pellucid glands submarginally and in laminae; heads loosely cymiform-clustered or borne singly, often nodding on terete to clavate peduncles 1–2(–3) cm long; involucre narrowly campanulate to turbinate, 9–12 mm high; phyllaries 5, green to purplish, linear to oblong, acuminate to obtuse, each usually bearing 2–6 pellucid glands; florets mostly 10–20, corollas ochroleucous to brown or purple, 6–8 mm long, tubes very slender, much longer than the funnelliform throats, lobes lance-linear, equal to subequal; cypselae very slender, fusiform, 5–7 mm long, hirtellous; pappi of 20–30, tawny to purple-tinged, minutely scabrellous, unequal bristles to 7 mm long; $2n = 24$; flowering sporadically year round.

Dry, brushy slopes in Tropical Deciduous Forest, Savanna, or Thorn Woodland; uncommon in Northern Highlands, Central Depression, and Sierra Madre; 560–1000 m. Southern Mex. (Tam., Ver., Yuc., Camp., Pue., Oax.), Guat., Hond., Salv., C.R. CHIAPAS COLLECTIONS: SI 2272 (TEX); 13651; 24835; 30518; 36604; 45954; 50511; 52857.

Johnson (1969) extended synonymy of *Porophyllum punctatum* to include: *P. divaricatum* Rydb., *P. jorullense* (Kunth) Cass., *P. oblongum* Rydb., and *P.*

palmeri Rose. I believe those names apply to a distinct species that ranges from Guerrero to Sinaloa.

4. ***Porophyllum ruderale* (Jacq.) Cass. in F. Cuvier, Dict. sci. nat., ed. 2. 43:56. 1826.**

— *Kleinia ruderalis* Jacq., Enum. syst. pl. 28. 1760. — LECTOTYPE: (Keil 1975:1234): Jacq., Selec. stirp. amer. hist. t. 127. 1763.

Fuller synonymy is given by Keil (1975).

All Chiapan collections of this species are referable to:

4a. ***Porophyllum ruderale* (Jacq.) Cass. var. *macrocephalum* (DC.) Cronq., Madroño 20:255. 1970.**

— *Porophyllum macrocephalum* DC., Prodr. 5:648. 1836. — TYPE: Mexico, "prope Villalpando," 1829, *W. Mendez s.n.* (G-DC, microfiche!).

Fuller synonymy is given by Keil (1975).

ILLUSTRATION: Ann. Missouri Bot. Gard. 62:1236. 1975 [Fl. Pan.].

Erect, often coarse, sometimes glaucous, annuals, mostly 5–15 dm high; leaves opposite or alternate, petioled, blades

broadly ovate to elliptic or obovate (very thin), mostly 15–35 mm long, margins usually sinuate with a pellucid gland in each sinus and blades often with glands scattered in laminae; heads mostly borne singly on ebracteate, often clavate, peduncles 15–65 mm long; involucre narrowly cylindric to turbinate, 20–25 mm high; phyllaries 5, linear to lance-linear, narrowly scarious-margined, each streaked or dotted with 6–11+ pellucid glands; florets 30–80+, corollas greenish proximally, purplish distally, 8–13 mm long, tubes very slender and much longer than the funnellform, often geniculate, throats, lobes lanceolate, often unequal; cypselae very slender, cylindro-fusiform, striate, hirtellous, 9–12 mm long; pappi of ca. 50(–100), tawny, scabrelous bristles 5–11 mm long; $n = 11$; flowering mostly Oct.

Ridges, wooded slopes, and canyon walls in Tropical Rain, Evergreen Seasonal, and Tropical Deciduous forests; uncommon in Northern and Eastern highlands and in Central Depression; 300–900 m. Southwestern U.S. (Ariz., Tex.), Mex. (Baja C. S., Son., Chih., Coah., N.L., Tam., Sin., Dgo., S.L.P., Nay., Jal., Gto., Qro., Mich., Méx., Mlos., Pue., Ver., Gro., Oax., Yuc., Chis.), Guat., Hond., C.R., Pan.; Antill.; S.A. (Col., Ven., Ecu., Gal., Peru, Bol., Braz.). CHIAPAS COLLECTIONS: *Br* 126 (CAS); *T* 3155 (DS, LL); 13507; 20169; 20497; 28797; 39921; 46310; 46496; 47513; 48520; 53801; 54131; 54524; 54697; 70329.

54. RENSONIA

Rensonia S. F. Blake, J. Wash. Acad. Sci. 13:144. 1923. — TYPE: *Rensonia salvadorica* S. F. Blake.

Shrubs or trees, to 5 m high; leaves opposite, petiolate, blades ovate-acuminate to lanceolate, obscurely palmately nerved distal to their bases, margins serrate; capitulescences of 30–60+ heads in bracteate, corymbiform to paniculiform associations; involucre obconic to campanulate, 5–8 mm high; phyllaries 8–9 in 2 series, oblong to oblanceolate, proximally thickened and coriaceous, distally herbaceous; receptacles slightly convex; paleae oblong-linear to subulate; ray florets 8–9, pistillate, fertile, corollas yellow, laminae narrowly ovate; disc florets 15–20, functionally staminate, corollas ochroleucous to yellow, tubes about half as long as the abruptly dilated, narrowly cylindro-funnelform throats, lobes 5, subequal, deltate, hispid; styles undivided or the branches astigmatic, slender, hispidulous; cypselae radially flattened, adaxially convex, scarious-winged, the wings entire or distally lacerate, prolonged into triangular-attenuate appendages; pappi none or inconspicuous crowns; $x = 17$.

Monotypic; perhaps related to *Baltimora* L. and *Wedelia* Jacq.

1. ***Rensonia salvadorica* S. F. Blake, J. Wash. Acad. Sci. 13:145. 1923.**

— TYPE: Salvador, Ahuachapán, ravine of Río Ataco, back of Ahuachapán, 800–100 m, 17–19 Jan 1922, *P. C. Standley* 20090 (US).

ILLUSTRATION: Fig. 39.

Branched shrubs or trees, to 5 m; petioles 14–45(–85) mm long, scabrelous, leaf blades 9–15(–26) cm long, 3–8(–10) cm wide, bases cuneate, margins finely serrate, abaxial faces strigose, adaxial faces sparsely scabrous; peduncles to ca. 2 cm

long; phyllaries obscurely 3–5-nerved, closely scabrelous; paleae ca. 5 mm long, weakly persistent; tubes of ray corollas ca. 1.5 mm long, glabrous, laminae 4–5 mm long, abaxially sparsely hairy; ovaries of disc florets very slender, ca. 3.5 mm long, disc corolla tubes ca. 1.3 mm long, throats ca. 3 mm long, lobes 0.4–0.7 mm long, sparsely hairy; cypselae bodies obovate to rounded-cuneate in outline, 5–6 mm long, distally sparsely hispidulous; $2n = 34$.

Shrubby slopes in Tropical Deciduous Forest; rare in SE Sierra Madre; 700 m. Southern Mex. (Ver., Oax., Chis.), Guat., Salv., C.R. CHIAPAS COLLECTIONS: *EM* 750 (LL); *Panero* 2532 (TEX); 28630.

55. ROJASIANTHE

Rojasianthe Standl. & Steyerl., Publ. Field Mus. Nat. Hist., Bot. Ser. 22:311., figs. 1–2. 1940. — TYPE: *Rojasianthe superba* Standl. & Steyerl.

Shrubs or trees, to 6 m high; leaves opposite, petiolate, blades usually 10–20+ cm long, pentagonal to deltate, 3–5(–7)-nerved from near their bases; heads mostly 3–6 in corymbiform associations; involucre broadly hemispheric, 2–3 cm diam.; phyllaries heteromorphic, the outer 5–6 reflexed, cartilaginous, the inner 8–16 in 2–3 series, erect, more membranous; receptacles convex to ovoid; paleae conduplicate, pedately pectinate with subulate lobes, indurate in fruit; ray florets 12–16, neuter, corollas white to pale lilac or pink, tubes stout, laminae ligulate-elliptic, distally attenuate; disc florets 150–200+, bisexual, fertile, corollas proximally ochroleucous, distally dark brown to purplish green, tubes narrowly cylindric, puberulent, throats abruptly ampliate, campanulate, 1/3–1/2 as long as tubes, glabrous, lobes 5, lance-linear, about as long as throats, glabrous; filaments distally pilose with multicellular hairs; style branches deltate-dilated, hispidulous; cypselae blackish or mottled with brown, compressed, lenticular to weakly quadrate, minutely pilose, at least marginally and distally; pappi caducous, of ca. 10, stramineous, barbellulate setae; $x = 19$.

Monotypic.

1. *Rojasianthe superba* Standl. & Steyerl., Publ. Field Mus. Nat. Hist., Bot. Ser. 22:315, figs. 1–2. 1940.

— TYPE: Guatemala, San Marcos, Volcán Tajumulco, ca. 7 miles [11 km] from San Sebastián, above Las Canoas, 3300–3900 m, 16 Feb 1940, *J. A. Steyermark 35835* (F).

ILLUSTRATIONS: **Fig. 40**; protologue.

Shrubs or trees, to 6 m high, sometimes flowering the first year; stems proximally corky-lenticellate, distally brunneous with fine hairs; petioles 2–10 cm long, leaf blades 10–22 cm long, 8–22 cm wide, auricles ca. 3 mm long at insertion of blade onto petiole, blades basally broadly cuneate to truncate or cordate, apically acute to acuminate, margins coarsely and irregularly serrate with apiculate teeth, abaxial faces puberulent and densely dotted with resin globules, adaxial faces minutely strigillose or scabrellous; heads borne singly or 2–6+ in open, corymbiform associations at ends of branches; peduncles 1–8+ cm long, brunneous-hirtellous; outer phyllaries 5–6, cartilaginous, lance-ovate to ovate, 8–12 mm long, early reflexed, brun-

neous-strigillose on both faces, the inner 8–16, more membranous, ovate to obovate or orbicular, 9–18 mm long, erect to spreading, scarious-margined, faces usually strigillose and/or ciliate, sometimes glabrous; receptacles 6–8+ mm diam.; paleae greenish to stramineous, cartilaginous, 5–6 mm long, lacerate with 6–8(–12) subulate lobes, becoming somewhat longer and more indurate and pungent in fruit (sometimes lacking from center of head); ray florets 12–16, corolla tubes ca. 2 mm long, laminae 25–40 mm long, abaxially puberulent and resinous gland-dotted; disc florets 150–200+, corolla tubes 3–3.5 mm long, sparsely puberulent with multicellular hairs, throats 1.5–2 mm long, lobes 3–3.5 mm long; style branches 2–2.5 mm long; cypselae 4–6 mm long; pappus setae 1–3 mm long; $2n = 38$; flowering Jan–Feb.

Moist, shaded ravines in Montane Rain Forest; uncommon in E Sierra Madre; 2400–3300 m. Southern Mex. (Chis.), Guat. CHIAPAS COLLECTIONS: *Cro 47358* (LL, MO, UC); *EM 2850* (LL); *Panero 2892* (CAS, TEX); 58223.

56. RUMFORDIA

Rumfordia DC., Prodr. 5:549. 1836. — TYPE: *Rumfordia floribunda* DC.

Shrubs or perennial herbs, to 5 m high; leaves opposite, petiolate or sessile, petioles often winged and/or basally auriculate or connate, blades rounded-deltate to truncate, ovate, elliptic, or lanceolate, margins serrate to subentire, faces glabrous or variously hairy, the abaxial often resinous gland-dotted; heads usually in compound corymbiform or paniculiform aggregations; involucre mostly hemispheric; phyllaries heteromorphic, the outer 5, spreading to reflexed, suborbicular to ovate or lance-elliptic, to 15(–25) mm long, glabrous or villous and/or stipitate-glandular, the inner phyllaries 6–20, usually shorter than the outer, navicular, infolding mature ray cypselae, variously hairy and stipitate-glandular; receptacles mostly conical; paleae similar to inner phyllaries, narrower and more scarious; ray florets 6–20, pistillate, fertile, corollas yellow, often fading to white, tubes very slender, pubescent with glandular and eglandular hairs, laminae ovate to narrowly oblong, minutely 3-toothed; disc florets 10–80(–200), bisexual, fertile, corollas yellow, turning dark with age, variously glabrous or hairy, tubes very slender, 0.5–1 times as long as the abruptly dilated throats, lobes 5, deltate, equal; style branches stout to slender with short, conic-deltoid, papillate to subhispidulous appendages; cypselae black, stoutly obovate to cuneate in outline, subterete to somewhat flattened, striate, glabrous; pappi none; $x = 12$ (?).

Six species, of scattered distribution over S Mexico and through Central America; very closely related to *Axiniphyllum* Benth., *Sigesbeckia*, and *Smallanthus*.

REFERENCE: SANDERS, R. W. 1977. Taxonomy of *Rumfordia* (Asteraceae). Syst. Bot. 2:302–316.

- a. Leaf blades elliptic to lanceolate with main veins arising from mid-rib, abaxial faces not resinous gland-dotted; outer phyllaries 3–6 mm long 2. *R. penninervis*
- aa. Leaf blades deltate-ovate to lanceolate with 3 strong nerves arising from just beyond apex of petiole, abaxial faces resinous gland-dotted (look closely); outer phyllaries 8–25 mm long 1. *R. guatemalensis*

1. **Rumfordia guatemalensis** (J. M. Coult.) S. F. Blake, J. Wash. Acad. Sci. 18:25. 1928.

— *Tetragonathea guatemalensis* J. M. Coult., Bot. Gaz. 16:99. 1891. — TYPE: Guatemala, Alta Verapaz, Senahu, 3500 ft. [1066 m], Apr 1889, *J. Donnell Smith 1592* (US).

Rumfordia media S. F. Blake, J. Wash. Acad. Sci. 28:490. 1938. — TYPE: Mexico, Chiapas, Sierra Madre, Mt. Ovando, 15°25'N, 92°36'W, 1000 m, *E. Matuda 710* (US; isotype: MICH).

For additional synonymy, see Sanders (1977).

ILLUSTRATIONS: Fig. 41; Syst. Bot. 2:310. 1977.

Coarse herbs, 1–2(–5) m high; petioles of larger leaves cuneately winged, mostly 6–30 cm long, sometimes auriculate or connate at base, uppermost leaves often sessile, leaf blades deltate-ovate to lanceolate with 3 strong veins arising just beyond apex of petiole, (4–)10–30 cm long, 3–20+ cm wide, bases often subhastate or toothed, margins serrate, faces glabrous or sparsely villous to strigose, the abaxial usually resinous gland-dotted; heads (3–)15–60 in terminal corymbiform or paniculiform associations; peduncles 1–3 cm long; outer phyllaries ovate to oblanceolate, 8–25+ mm long, nearly glabrous to hirsute and/or stipitate-glandular, inner phyllaries ca. 15–25, ovate to lance-deltate, 3–8 mm long, hirsute and stipitate-glandular; receptacles tuberculate; paleae obovate, strigose and/or stipitate-glandular, ciliolate distally; ray florets mostly 8–15+, corollas yellow, tubes 2–5 mm long, laminae cuneate to oblanceolate, 5–14 mm long; disc florets 20–100+, corollas yellow, tubes 2–4 mm long, pilose with pointed hairs and stipitate-glandular, about equalling the campanulate throats, lobes ca. 1 mm long; style branches ca. 2 mm long, weakly papillate-dilated at tip; cypselae stoutly obovoid in outline, 1.8–2.5 mm long, rounded to 3–4-angled in cross section, glabrous; pappi none; flowering mostly Oct–Mar.

Wooded slopes along streams, etc.; uncommon in Northern Highlands and Sierra Madre; 600–3000 m. Southern Mex.

(Hgo., Gro., Oax., Chis.), Guat., C.R., Pan. CHIAPAS COLLECTIONS: *C 66* (DS); *EM 710* (MICH, US); *T 5996* (TEX); *T 7362* (CAS); 46802; 49909; 50467; 55774; 58111.

2. **Rumfordia penninervis** S. F. Blake, Brittonia 2:343. 1937.

— TYPE: Guatemala, Quezaltenango, Quezaltenango-Colomba road, 2285 m, *A. F. Skutch 1973* (A; isotypes: F, LL, NY, US).

ILLUSTRATION: Syst. Bot. 2:310. 1977.

Shrubs, to ca. 5 m high; leaves sessile, blades elliptic to lanceolate with main veins arising from mid-rib, 8–20(–40) mm long, 2–8(–12) cm wide, margins serrate with callous teeth, faces sparsely hairy or glabrous; heads 20–50(–100) in corymbiform to paniculiform aggregations; peduncles very slender, 15–35 mm long, sparingly to densely hairy with multicellular trichomes; involucre broadly hemispheric; outer phyllaries suborbicular to broadly elliptic, 3–6 mm long, glabrous, appressed to the inner ones or spreading, inner phyllaries 8–12, navicular-cucullate and attenuate, each infolding the subtended ray floret ovary, 2–3 mm long, stipitate-glandular; receptacles conic, ca. 1.5 mm high; paleae similar to inner phyllaries but narrower; ray florets 8–12, corollas bright yellow, tubes 1.5–3 mm long, hairy, laminae narrowly oblong to elliptic, 7–14 mm long; disc florets 40–60, corollas pale yellow turning to buff, tubes 1.1–1.5 mm long, pubescent, throats abruptly cylindro-campanulate, 2.1–2.5 mm long, lobes 0.5 mm long, limbs glabrous; style branches stout, 0.7–1.1 mm long, appendages, short, deltoid-conic; cypselae stout, compressed, weakly arcuate, 1.5–2.5 mm long, striate, glabrous; pappi none; flowering Nov–Dec.

Steep, wooded slopes and canyon walls in Montane Rain and Evergreen Cloud forests; uncommon in E Sierra Madre; 2100–3000 m. Southern Mex. (Chis.), Guat. CHIAPAS COLLECTIONS: *SI 3104* (CAS, TEX); 22722; 31164; 41614; 42725; 55769; 65717; 66031.

57. SABAZIA

Sabazia Cass. in F. Cuvier, Dict. sci. nat., ed. 2. 46:480. 1827. — TYPE: *Sabazia humilis* (Kunth) Cass. = *Eclipta humilis* Kunth.

Baziassa Steud., Nomencl. bot., ed. 2. 1:192. 1840. — TYPE: *Baziassa humilis* (Kunth) Steud. = *Eclipta humilis* Kunth = *Sabazia humilis* (Kunth) Cass.

Tricarpha Longpre, Publ. Mus. Michigan State Univ., Biol. Ser. 4:377. 1970. — TYPE: *Tricarpha purpusii* (Brandege) Longpre = *Sabazia purpusii* Brandege.

Perennials, rarely suffrutices, often rooting at proximal nodes, stems rarely more than 1 m long; leaves opposite, sessile or petiolate, blades mostly ovate or rhombic to lanceolate or linear, margins variously serrate or entire, faces commonly strigose, pilose, or hirsute, sometimes glabrous; heads mostly terminal and borne singly, sometimes arising in distal axils and becoming loosely, cymosely associated; peduncles 3–18 cm long, strigose to pilose or pilose and stipitate-glandular; involucre mostly loosely, cymosely associated; peduncles 3–18 cm long, strigose to pilose or pilose and stipitate-glandular; involucre mostly campanulate to hemispheric, 6–10 mm diam.; phyllaries 12–16 in 2–4 series, unequal, thinly herbaceous to membranous, striate-nerved, often distally scarious and purplish, typically glabrous; receptacles ovoid to conical; paleae stramineous to hyaline, scarious, lanceolate to spatulate or linear (sometimes mixed in single heads), often acuminate, sometimes bifid or trifid; ray florets mostly 5, 8, or 13, pistillate, fertile, corollas inconspicuous to showy, mostly white, commonly pink to purplish abaxially, shorter than the abruptly campanulate throats, lobes 5, deltate-ovate; style branches hispidulous with acute to subulate appendages; cypselae black, obpyramidal, glabrous or sparsely strigillose to hispidulous (cypselae and pappi of ray florets may differ from those of disc florets); pappi none or of 12–16, persistent, lanceolate to cuneate, erose-ciliate to subplumose squamellae; $x = 8$; $2n = 48$.

About 12 to 15 species, all New World, mostly Mexican, extending through Central America into northern South America; very closely related to *Alloispermum* and *Galinsoga*.

REFERENCES: LONGPRE, E. K. 1970. The systematics of the genera *Sabazia*, *Selloa* and *Tricarpha* (Compositae). Publ. Mus. Michigan State Univ. Biol. Ser. 4:283–384; URBATSCH, L. E. and B. L. TURNER. 1975. New species and combinations in *Sabazia* (Heliantheae, Galinsoginae). Brittonia 27:348–354.

1. *Sabazia sarmentosa* Less., Linnaea 5:148. 1830.

— *Baziasa sarmentosa* (Less.) Steud., Nomen. bot., ed. 2. 1:192. 1840. — TYPE: (fide Longpre 1970): Mexico, Veracruz, "Serro Colorado," Aug 1828, C. J. W. Schiede and F. Deppe 296 (HAL; isotype: GH).

All Chiapas collections of this species are referable to:

1a. *Sabazia sarmentosa* Less. var. *sarmentosa*.

Allocaulus sabazioides Schltdl., Linnaea 9:590. 1834. — *Calea sabazioides* (Schltdl.) Hemsl. in F. Godman and O. Salvin, Biol. cent.-amer., Bot. 2:206. 1881. — TYPE: (fide Longpre 1970): Mexico, Veracruz, near "San Miguel de Solado and La Joya," Jun 1829, C. J. W. Schiede and F. Deppe s.n. (HAL).

Tridax ehrenbergii Schultz-Bip. ex Klatt, Leopoldina 23:145. 1887. — TYPE: Mexico, Oaxaca, Chinantla, Jul 1841,

F. M. Liebmann s.n. [598] (C).

Sabazia radicans S. F. Blake, Contr. U.S. Natl. Herb. 22:615. 1924. — TYPE: Mexico, Puebla (Hidalgo?), Honey, near Trinidad Iron Works, 11 Jul 1904, C. G. Pringle 8943 (US; isotypes: GH, MO, MSC, NY, UC!).

ILLUSTRATION: none found.

Sprawling, perennials, stems to 6 dm long, commonly rooting at nodes; petioles 2–12(–25) mm long, leaf blades rhombic to ovate, 20–75 mm long, 12–30 mm wide, bases broadly cuneate to rounded, margins coarsely serrate, apices acuminate

to attenuate, faces sparsely to densely pilose to strigillose; heads terminal and in distal axils; peduncles 3–18 cm long, shaggy strigose to hispidulous, hairs often with purplish septae, sometimes also stipitate-glandular; involucre hemispheric to broadly campanulate, 6–10 mm diam.; phyllaries 12–16, lance-linear to narrowly ovate, the outer 2–4.5 mm long, the inner 4–8 mm long, all glabrous; receptacles ovoid to conical, ca. 2 mm high; paleae palely stramineous, linear to lanceolate, 2.5–5.5 mm long, sometimes apically trifid; ray florets mostly 8, corollas uniformly white or abaxially purplish, tubes stout to slender, 1–2 mm long, hispidulous, laminae oval to obovate or cuneate, 6–12 mm long; disc florets ca. 80–120, corollas dull yellow, 2–3 mm long, proximally hispidulous, tubes 0.5–0.9 mm long, throats abruptly ampliate, cylindric-campanulate, 1.2–1.9 mm long, lobes deltate-ovate, 0.5–0.6 mm long; style branches 0.5–0.7 mm long, hispidulous; cypselae black, obpyramidal, 1.5–2 mm long, glabrous or sparsely strigillose to hispidulous; pappi none or of 12–16, fimbriate to erose-ciliate squamellae 0.5–2 mm long; $2n = 48$; flowering mostly Aug–Dec.

Usually in open, wet places in Evergreen Cloud, Pine-Oak-Liquidambar, and Pine-Oak forests; locally common on Central Plateau and in E Sierra Madre; 2000–3000 m. Southern Mex. (Pue., Ver., Gro., Oax., Chis.), Guat. CHIAPAS COLLECTIONS: L 1864 (DS); EM 4710 (LL); EWN 3232 (GH, US); T 389 (DS); T 982 (DS); T 994 (DS); T 1263 (DS); T 1277 (DS); 7005; 12478; 15329; 22812; 25797; 31140; 39585; 40273; 40505; 46255; 51448; 51937; 55702; 55890.

The types of *Sabazia pinetorum* S. F. Blake, Brittonia 2:347. 1937 (Type: Guatemala, Huehuetenango, Sierra Cuchumatanes, 3325 m, 14 Sep 1934, *Skutch 1234*, in part), and *S. pinetorum* S. F. Blake var. *dispar* S. F. Blake, loc. cit. (same type, in part), may be conspecific with that of *S. sarmentosa*.

58. SALMEA

Salmea DC., Cat. pl. horti monsp. 57, 140. 1813, nom. conserv. — TYPE: *Salmea scandens* (L.) DC. = *Bidens scandens* L. *Hopkirkia* Spreng., Novi provent. 23. 1818. — TYPE: *Hopkirkia eupatoria* (DC.) Spreng. = *Salmea eupatoria* DC. = *Salmea scandens* (L.) DC.

Fornicaria Raf., Sylva tellur. 116. 1838. — TYPE: *Fornicaria scandens* (L.) Raf. = *Bidens scandens* L. = *Salmea scandens* (L.) DC.

Salmeopsis Benth. in G. Benth and J. D. Hooker, Gen. pl. 2:381. 1873. — TYPE: *Salmeopsis clausenii* Benth. = *Salmea scandens* (L.) DC.

Vines and scandent or erect shrubs, to 10+ m high; leaves opposite, petiolate to subsessile, blades often coriaceous, typically 3-nerved from near their bases, margins entire or obscurely or remotely toothed, faces usually glabrous and shiny, the abaxial sometimes sparsely hirtellous to tomentose; heads (1–)5–12+ together in corymbiform, subumbelliform, or paniculiform clusters, the clusters often much aggregated at ends of branches; peduncles often bracteolate; involucre obconic to campanulate, mostly 3–8 mm high; phyllaries strongly imbricate, those of the outer 2–3 series shorter, flatter, more membranous than the navicular, somewhat scarious bracts of the inner 2–3 series; receptacles narrowly conical; paleae similar to innermost phyllaries; phyllaries and paleae glabrous or hirtellous to sparsely tomentose, sometimes streaked with resinous exudate; ray florets none; disc florets mostly 20–60, corollas white to ochroleucous or pinkish, tubes shorter than the dilated, cylindric throats, lobes 5, subequal, lance-linear to lance-deltate, glabrous or sparsely hirsutulous abaxially, often papillate adaxially; anthers blackish; style branches linear, subtruncate, stigmatic nearly to hirsutulous apices; cypselae black to brown, compressed, oblanceolate in outline, faces

glabrous or hirtellous to appressed-puberulent, margins ciliate, at least distally; pappi of 2(-3) slender, barbellulate, awns or coarse bristles plus 0-10+ much shorter, finer bristles or squamellae; $\chi = 18$.

A dozen or so species, all American, ranging from Mexico (Tam., Jal.) through Central America, Bahamas, and Antilles into South America (to Peru, Arg., and Parag.).

REFERENCES: BLAKE, S. F. 1915. A revision of *Salmea* and some allied genera. J. Bot. 53:193-202, 225-235; BOLICK, M. R. 1991. Systematics of *Salmea* DC. (Compositae: Heliantheae). Syst. Bot. 16:462-477.

- a. Phyllaries and paleae acute to obtuse, weakly, if at all, ciliate 2. *S. scandens*
- aa. Phyllaries and paleae truncate-rounded, distally whitened with minute marginal and submarginal hairs 1. *S. orthocephala*

1. *Salmea orthocephala* Standl. & Steyer., Publ. Field Mus. Nat. Hist., Bot. Ser. 23:145. 1944.

— TYPE: Guatemala, Guatemala, Concuá Bridge over Río Matagua, 300 m, 8 Dec 1938, *P. C. Standley* 59321 (F).
ILLUSTRATION: None found.

Much like, and perhaps conspecific with, *Salmea scandens*; it differs primarily as follows: seldom viney, mostly erect to clambering shrubs, to 3 m high; outer phyllaries round to obovate, inner phyllaries apically truncate-rounded, all distally whitened and ciliate with fine hairs; paleae similarly membranous and whitened distally; $2n = 32$; flowering Oct-Dec.

Wooded slopes in Evergreen Cloud, Seasonal Evergreen, and Tropical Deciduous forests; uncommon on Central Plateau and in Central Depression and SE Sierra Madre; 500-800(-2000) m. Southern Mex. (Chis.), Guat., Hond. CHIAPAS COLLECTIONS: *Lan* 759 (TEX); *T* 3214 (DS); 13883; 20465; 29033; 41772; 42267; 42593; 46997; 47633; 48511; 48913; 54481; 72668.

2. *Salmea scandens* (L.) DC., Cat. pl. horti. monsp. 141. 1813.

— *Bidens scandens* L., Sp. Pl. 833. 1753. — *Fornicaria scandens* (L.) Raf., Sylva tellur. 116. 1838. — *Salmea scandens* (L.) DC. var. *genuina* S. F. Blake, J. Bot. 53:197. 1915. — TYPE: Mexico, Veracruz, *W. Houstoun* s.n. (BM, Herb. Hort. Cliff.).

Santolina amellus L., Syst. nat., ed. 10. 1207. 1759. — *Calea amellus* (L.) L., Sp. pl., ed. 2. 1179. 1763. — *Salmea scandens* (L.) DC. var. *amellus* (L.) Kuntze, Revis. gen. pl. 1:361. 1891. — TYPE: Jamaica, *P. Browne* s.n. (LINN: 984.3).

Salmea eupatoria DC., Cat. pl. horti monsp. 141. 1813. — *Hopkirkia eupatoria* (DC.) Spreng., Novi provent. 23. 1819. — TYPE: Not designated; cf. Blake (1915).

Salmea eupatoria DC. var. (β) *intermedia* DC., Prodr. 5:493. 1836. — TYPE: Jamaica, 1807, collector unknown (G-DC, microfiche!).

Spilanthes nitidus La Llave & Lex., Nov. veg. descr. 1:28. 1824. — *Salmea nitida* (La Llave & Lex.) Schultz-Bip. ex Klatt, Leopoldina 23: 145. 1887, pro syn. sub *Salmea scandens*. — TYPE: Mexico, Veracruz, San José del Corral, Mar-Apr, *P. La Llave* s.n. (not located, name included here on basis of description).

Salmea grandiceps Cass. in F. Cuvier, Dict. sci. nat., ed. 2. 47:88. 1827. — TYPE: Apparently lost; cf. Blake (1915).

Salmea oppositiceps Cass. in F. Cuvier, Dict. sci. nat., ed. 2. 47:88. 1827. — TYPE: Apparently lost; cf. Blake (1915).

Salmea parviceps Cass. in F. Cuvier, Dict. sci. nat., ed. 2. 47:89. 1827. — TYPE: Apparently lost; cf. Blake (1915).

Salmea salicifolia Brongn. ex Neumann, Rev. Hort., ser. 3. 1:87. 1847. — TYPE: Unknown; cf. Blake (1915).

Salmea sessilifolia Griseb., Fl. Brit. W. I. 375. 1861. — TYPE: Jamaica, Westmoreland, *W. Purdie* s.n. (K).

Salmeopsis clausenii Benth., Hooker's Icon. Pl. 12:1152. 1876. — Brasil, Minas Gerais, 1840, *P. Claussen* s.n. (K; isotype: TEX).

Verbesina scandens Klatt, Leopoldina 25:106. 1889. — TYPE: Puerto Rico, "Hab. Puerto Ricco, Leg. ?" (protologue) (B, destroyed; name included here on basis of description).

Salmea scandens (L.) DC. var. *obtusata* S. F. Blake, J. Bot. 53:197. 1915. — TYPE: Guatemala, Alta Verapaz, near Cobán, 1342 m, Mar 1879, *H. von Tuerkheim* 392 (BM; isotypes: GH, US).

Salmea scandens (L.) DC. subsp. *paraguariensis* Hassler, Repert. Spec. Nov. Regni Veg. 14:174. 1915. — LECTO-TYPE: (Bolick 1991:465): Paraguay, *É. Hassler* 12233 (G; isolectotype: MO).

Salmea scandens (L.) DC. var. *pubescens* S. F. Blake, Brittonia 2:351. 1937. — *Salmea pubescens* (S. F. Blake) Standl. & Steyer., Publ. Field Mus. Nat. Hist., Bot. Ser. 23:146. 1944. — TYPE: Guatemala, Huehuetenango, 2040 m, 11 Nov 1934, *A. F. Skutch* 1644 (A; isotypes: F, TEX, US).

Salmea tomentosa D. L. Nash, Phytologia 31:361. 1975. — TYPE: Guatemala, Baja Verapaz, north of divide north of Santa Rosa, *P. C. Standley* 69898 (F).

ILLUSTRATIONS: Fig. 42; Ann. Missouri Bot. Gard. 62:1129. 1975 [Fl. Pan.].

Vines, to 10+ m, or clambering to erect shrubs, to 3+ m high; petioles (1-)12-20 mm long, sometimes narrowly winged, leaf blades often coriaceous, lanceolate to ovate, obscurely 3-nerved from just distal to their bases, 6-12+ cm long, 2-6+ cm wide, bases cuneate to rounded-truncate, margins entire or remotely toothed, apices acute to acuminate, faces mostly glabrous, often shiny, the abaxial sometimes sparsely pilose to tomentose, especially on nerves; heads mostly 5-12 in corymbiform to subumbelliform clusters, the clusters terminal and axillary, often gathered in masses at ends of branches; peduncles mostly 5-12(-25) mm long, remotely bracteolate, glabrous or tomentose; involucre obconic to campanulate or turbinate, mostly 3-5 mm high; outer phyllaries 6-12, broadly lanceolate to ovate-acute, flat, 1.5-3 mm long, membranous, glabrous or puberulent, the inner 12-16, lance-linear to linear, weakly

navicular, apically acute to obtuse, 3–5 mm long, scarious, weakly keeled, minutely puberulent, at least distally; paleae much like inner phyllaries but more navicular and each infolding the subtended floret; receptacles narrowly conical; florets ca. 20–40+, corollas white to ochroleucous or pinkish, tubes 0.7–1 mm long, slightly narrowed below the dilated, cylindric throats ca. 1.5 mm long, lobes lance-deltate, subequal, 0.4–0.7 mm long, glabrous or sparsely hirsutulous abaxially, minutely papillate adaxially; style branches ca. 1 mm long; cypselae 2.5–3.5 mm long; pappi of 2(–3) awns 1–2+ mm long plus 0–10+ much shorter bristles; $2n = 36, 64, 66$; flowering mostly Dec–Feb.

Steep, wooded slopes or disturbed places within secondary growth in Montane Rain, Evergreen Cloud, Seasonal Evergreen, Pine-Oak-*Liquidambar*, and Pine-Oak forests; uncommon (or undercollected) in Northern Highlands, in Eastern Highlands, on Central Plateau, in Central Depression, in Sierra

Madre, and on Pacific Coastal Plain; 150–2600 m. Eastern and southern Mex. (Tam., S.L.P., Hgo., Mex., Ver., Gro., Chis.), Guat., Bel., Salv., Nic., C.R., Pan.; Antill. (Cuba, Jam., Hisp., P.R., L. Antill.); S.A. (Col., Ven., Ecu., Peru, Bol., Arg., Parag.). CHIAPAS COLLECTIONS: *Bar 1378* (TEX); *Br 937* (CAS); *Cro 65196* (TEX); *G 542* (YU); *HM 520* (DS, LL, NY); *MGG 653* (CAS, TEX); *GS 7* (CAS); *GS 50* (CAS); *GG 417* (CAS); *J 1624* (US); *L 2982* (DS); *Lo 385* (CAS); *M-1 197* (CAS); *EM 5099* (CAS, F, LL); *EM 18620* (DS); *EM 18632* (DS, F, TEX); *EM 18679* (DS); *EWN 3839* (GH, US); *PM 151* (CAS, TEX); *PM 165* (CAS, TEX); *SC 456* (CAS); *SC 512* (CAS); *S&S 2249* (GH, MO, NY, US); *SI 2962* (CAS); *T 164* (DS); *T 1896* (DS); *T 2158* (DS, LL); *T 3711* (DS); *T 3914* (DS, LL); *T 9709* (CAS); *TW 2403* (TEX); *Z 770* (DS); *7912*; *8839*; *11743*; *23263*; *23413*; *24084*; *31392*; *31442*; *31660*; *33432*; *42753*; *48608*; *49812*; *49931*; *50535*; *56830*; *58393*; *58502*; *66110*.

59. SANVITALIA

Sanvitalia Lam., J. Hist. Nat. 2:176–179. 1792. — TYPE: *Sanvitalia procumbens* Lam.

Lorentia Ortega, Nov. pl. descr. dec. 4:41. 1797. — *Laurentia* Steud., Nomencl. bot. 1:466. 1821. — TYPE: *Lorentia atropurpurea* Ortega = *Sanvitalia procumbens* Lam.

Annuals, rarely perennial or weakly suffrutescent, prostrate to erect, seldom more than 3 dm high; leaves opposite, petiolate or sessile, blades lanceolate to linear or obovate, margins entire or remotely toothed or lobed, faces sparsely to densely hairy with white, stiff, appressed to spreading or erect hairs, not glandular punctate; heads scattered at ends of branches, sessile or subsessile; involucre broadly hemispheric to nearly saucer-shaped, mostly 3–8 mm high; phyllaries mostly 8–20 in 2–3 series, oval to spatulate, chartaceous, outer 0–3 sometimes distally foliaceous, others usually acuminate with a stiff, subulate appendage, glabrescent to densely villous; receptacles conical; paleae basally stramineous and scarious, distally stramineous to purplish and chartaceous, navicular; ray florets 5–20, pistillate, fertile, corollas white or orange to greenish or golden yellow, soon fading, tubes wanting, laminae inserted directly on ovaries, subcoriaceous and marcescent, oblong to rounded-deltate; disc florets (15–)30–60, bisexual, fertile, corollas ochroleucous to translucent at bases, distally orange to brown or purple, stoutly cylindric to narrowly funnelform, tubes slightly narrower and much shorter than throats, walls of throats much thicker proximally than distally, lobes 5, deltate to lanceolate, tubes and proximal throats bearing both glandular and eglandular hairs; style branches hispidulous-dilated, subtruncate; cypselae of 3 forms in each head: ray cypselae ashy white, subterete to weakly 3-angled, stout, corky-surfaced, smooth to tuberculate, outer disc cypselae ashy to rufous or brown, somewhat flattened, obscurely 3-4-angled, rectangular to cuneate in outline, faces usually corky-tuberculate, inner cypselae brown to blackish with stramineous to whitish margins or tuberculae, flattened, ovate to elliptic in outline, including entire to pectinate wings, faces smooth to tuberculate, all cypselae or at least the inner bearing fine, uncinate hairs, especially on upper wing margins; pappi of ray cypselae usually of 3, stout, subulate awns, often the adaxial erect and the laterals spreading to reflexed, pappi of disc cypselae none or of 1–4, slender to stout awns, often inserted on inner shoulders of wing margins; $x = 8$ (but $2n = 22$ in *S. aberti*).

Five species, all American, principally southwestern United States and Mexico; one extending into Central America; another endemic to South America (Bol., Arg.); closely allied to *Zinnia*.

REFERENCES: TORRES, A. M. 1964. Revision of *Sanvitalia* (Compositae – Heliantheae). Brittonia 16:417–433; STROTHER, J. L. 1979. Extradition of *Sanvitalia tenuis* to *Zinnia* (Compositae – Heliantheae). Madroño 26:173–179.

1. *Sanvitalia procumbens* Lam., J. Hist. Nat. 2:176, t. 33. 1792.

— TYPE: Grown in Paris from seed sent by Gualtheri from “America meridionali”; no specimen seen; use of this name here is based on tradition.

Lorentia atropurpurea Ortega, Nov. pl. descr. dec. 4:41, t. 5. 1797. — *Laurentia atropurpurea* Steud., Nomencl. bot. 1:466. 1821. — TYPE: Grown in Madrid from seed sent by Sessé from Mexico; use of this name here is based on the illustration.

Sanvitalia villosa Cav., Icon. 4:31, t. 351. 1797. — TYPE: Grown in Madrid from seed from “Nova-Hispania”; no

specimen seen; use of this name here is based on the illustration.

Sanvitalia procumbens Lam. [var.] *oblongifolia* DC., Prodr. 5:628. 1836. — TYPE: Mexico, “Chapultepec,” 15 Jul 1827, J. L. Berlandier 372 (G-DC, microfiche!).

Sanvitalia acinifolia DC., Prodr. 5:628. 1836. — TYPE: Mexico, 1831, L. Alaman s.n. (G-DC, microfiche!).

Zexmenia thysanocarpa Donn.Sm., Bot. Gaz. 61:376. 1916. — TYPE: Mexico, Chiapas, San Jeronimo, 1907, G. N. Collins and C. B. Doyle 27 (US; isotype: F!).

ILLUSTRATIONS: Fig. 43; cited protologues; Brittonia 16:420. 1964.

Procumbent to ascending or erect annuals, stems to 3 dm long; leaves petiolate, blades lanceolate to lance-elliptic, 12–45 mm long, bases broadly cuneate, faces scabrous; heads terminal, borne singly, sessile or nearly so; involucre campanulate to broadly hemispheric, 4–6 mm high; phyllaries ca. 15, basally stramineous, distally purplish, mostly obovate, 0–3 outermost herbaceous, others each with a hard, stout, subulate point, all sparsely villous; paleae becoming purple distally, longer than disc florets, each tapering into a rigid, subulate point; ray florets 8–15, corollas yellow to orange, soon fading to pale yellow or ochroleucous, sometimes tinged with purple, laminae 2.5–5.5 mm long; disc florets 20–60, corollas basally translucent, distally orange-brown to purple, 2.7–3.5 mm long, tubes 0.3–0.6 mm long, throats slightly ampliate, cylindric, 1.8–2.3 mm long, lobes lance-deltate, ca. 0.7 mm long, tubes and lower throats glandular-puberulent and sparsely hispidulous, upper throats and lobes glabrous; style branches minutely hispidulous-dilated, subtruncate; ray cypselae ca. 3 mm long, outer disc cypselae ca. 2 mm long, inner disc cypselae black-bodied with

white to rufous wings, cuneate to elliptic in outline, ca. 4 mm long; pappi of ray cypselae 3, purplish, stout, subulate, often uncinat, awns 1.5–3.5 mm long, outer disc cypselae epappose, inner disc cypselae with 0–2 bristles inserted on inner shoulders of wing margins; $2n = 16$; flowering Jun–Dec.

Ruderal in Evergreen Seasonal and Tropical Deciduous forests; very common in Central Depression, extending onto lower Central Plateau; 450–1370 m. Southern U.S. (Tex., Calif.), Mex. (Chih., Coah., N.L., Tam., Dgo., Zac., S.L.P., Jal., Aguasc., Gto., Qro., Hgo., Méx., D. F., Mlos., Tlax., Pue., Ver., Oax., Yuc., Chis.), Guat., C.R. CHIAPAS COLLECTIONS: *C 118* (DS); *C 250* (DS); *Collins and Doyle 27* (F, US); *RMK 2984* (DS, TEX UC); *RMK 3100* (DS, TEX, UC); *RMK 3441* (DS, TEX, UC); *L 2641* (DS); *Pa 679* (CAS); *Sund 2466* (TEX); *T 2939* (DS, LL); *T 2984* (DS); *W&R 244* (TEX); *11881*; *13241*; *19822*; *20075*; *21936*; *28014*; *30271*; *37469*; *46422*; *52146*.

60. SCHISTOCARPHA

Schistocarpha Less., Linnaea 6:409. 1831.— TYPE: *Schistocarpha bicolor* Less.

Neilreichia Fenzl, Denkschr. Kaiserl. Akad. Wiss., Math.-Naturwiss. Kl. 1:258. 1850.— TYPE: *Neilreichia eupatorioides* Fenzl = *Schistocarpha eupatorioides* (Fenzl) Kuntze.

Zyconia Kuntze, Revis. gen. pl. 1:373. 1891.— TYPE: *Zyconia oppositifolia* Kuntze = *Schistocarpha eupatorioides* (Fenzl) Kuntze.

Coarse, perennial herbs, suffrutices, or shrubs, to 5 m high; leaves mostly opposite, the distal sometimes alternate, subsessile or petiolate, petioles winged, at least distally, blades mostly deltate to lance-ovate, triplinerved from near their bases, bases cuneate to truncate, margins serrate to coarsely dentate, apices acute to attenuate, abaxial faces velutinous to pilosulous or glabrate or glabrous, adaxial faces scabrellous to glabrate or glabrous; heads mostly 12–50+ in open to congested, corymbiform or paniculiform aggregations; peduncles stout or slender, 2–10(–25) mm long, usually pilose to hirtellous, sometimes stipitate-glandular as well; involucre cylindro-campanulate to hemispheric, mostly 4–8 mm high; phyllaries mostly 18–40 in 3–5 series, strongly graduate, herbaceous to chartaceous, usually striate-nerved, the outer shorter, lance-ovate to lanceolate, the inner lanceolate to linear, often scarious-margined, glabrous or puberulous to pilose; receptacles conic to hemispheric; paleae usually stramineous and striate-nerved, chartaceous to scarious, trifid-setaceous to cuneate-lacerate, weakly navicular, deciduous; peripheral, pistillate florets 8–70+ in 1–4+ series, fertile, corollas yellow, ochroleucous, or white, tubes stout to slender, glabrous or pilosulous to hispidulous, laminae none or minute to showy, then linear to ovate; inner, bisexual florets 5–80+, fertile, corollas yellow to ochroleucous, tubes slender, longer than to equal to the slightly ampliate, cylindric to narrowly funnellform throats, tubes and throats variously glabrous or scabridulous, pilosulous, or hispidulous, lobes 5, ovate-deltate to lance-deltate, glabrous or papillate to pilosulous; style branches slender, stigmatic in 2 lines almost to the papillate, slightly dilated tips; cypselae blackish with stramineous carpodia, narrowly to plumply, somewhat obliquely, obovoid or weakly obpyramidal, striate, glabrous; pappi of 25–35, white, fine, fragile, subequal, bristles in one series; $x = 8$.

Four or five Neotropical species centered in Mexico and Central America and extending into northern South America.

REFERENCES: ROBINSON, H. 1979. A study of the genus *Schistocarpha* (Heliantheae: Asteraceae). Smithsonian Contr. Bot. 42:1–20; TURNER, B. L. 1986. An underview of the genus *Schistocarpha* (Asteraceae-Heliantheae). Phytologia 59:269–286.

- a. Margins of phyllaries weakly, if at all, scarious-translucent, not shiny and undulate when dry; pistillate florets mostly 8–21 in one series; bisexual florets 20–40(12–80) 1. *S. bicolor*
- aa. Margins of phyllaries noticeably scarious-translucent, shiny, undulate (at least when dry); pistillate florets mostly 30–70 in 3–4+ series; bisexual florets 5–12(–18) 2. *S. eupatorioides*

1. *Schistocarpha bicolor* Less., Linnaea 6:409. 1831.

— TYPE: Mexico, ?Veracruz, C. J. W. Schiede and F. Deppe s.n. (HAL?)

Schistocarpha liebmannii Klatt, Leopoldina 23:146. 1887.— [*Neurolaena liebmannii* Schultz-Bip. ex Klatt, pro syn., Leopoldina 23:146. 1887]. — TYPE: Mexico, F. M. Liebmann “42” (C)

- Schistocarpha platyphylla* Greenm., Publ. Field Columbian Mus., Bot. Ser. 2:274. 1907. — TYPE: Guatemala, Quezaltenango, Volcán de Santa María, 5 Feb 1906, *W. A. Kellerman* 5295 (F; isotype: US).
- Schistocarpha kellermanii* Rydb. in N. L. Britton et al., N. Amer. fl. 34:306. 1927. — TYPE: Guatemala, Sacatepequez, Volcán de Agua, 4 Feb 1908, *W. A. Kellerman* 7293 (NY; isotypes: US).
- Schistocarpha longiligula* Rydb. in N. L. Britton et al., N. Amer. fl. 34:305. 1927. — TYPE: Guatemala, El Quiché, San Miguel Uspantán, 1892, *E. T. Heyde and E. Lux* 3383 (GH; isotype: US).
- Schistocarpha seleri* Rydb. in N. L. Britton et al., N. Amer. fl. 34:305. 1927. — *Schistocarpha longiligula* Rydb. var. *seleri* (Rydb.) B. L. Turner, Phytologia 59:280. 1986. — TYPE: Mexico, Chiapas, between San Martín and Ocosingo, 13 Mar 1896, *C. Seler and E. Seler* 2191 (NY).
- Schistocarpha velutina* Rydb. in N. L. Britton et al., N. Amer. fl. 34:304. 1927. — TYPE: Mexico, Veracruz, Mirador, 1842–3, *F. M. Liebmman* “490” (GH).
- Schistocarpha hondurensis* Standl. & L. O. Williams, Ceiba 3:65. 1952. — TYPE: Honduras, Francisco Morazán, San Juanico, 2000 m, 25 Mar 1918, *L. O. Williams and A. Molina* 13780 (EAP; isotype: US).
- Schistocarpha chiapensis* H. Rob., Smithsonian Contr. Bot. 42:11. 1979. — TYPE: Mexico, Chiapas, Sta. Rita, Mapastepec, Jan 1938, *E. Matuda* 2018 (US).
- Schistocarpha matudae* H. Rob., Smithsonian Contr. Bot. 42:14. 1979. — TYPE: Mexico, Chiapas, Mt. Ovando, 20 Dec 1936, *E. Matuda* 709 (US).
- Schistocarpha pseudoseleri* H. Rob., Smithsonian Contr. Bot. 42:16. 1979. — TYPE: Guatemala, San Marcos, between San Rafael Pie de La Cuesta and Palo Gordo, near Aldea Fraternidad, 1800–2400 m, 10–18 Dec 1963, *L. O. Williams et al.* 26256 (US).

ILLUSTRATION: Fig. 44.

Coarse herbs or suffrutes, to 2–(5) m high, sometimes smaller and sprawling; stems variously hirsute to pilosulous or glabrate; petioles mostly 1–5–(10) cm long, broadly to narrowly and cuneately winged, at least distally, sometimes connate across the nodes, leafblades deltate to lance-ovate or lanceolate, 6–12–(24) cm long, 3–8–(18) cm wide, bases cuneate to truncate or subcordate, margins serrate to coarsely dentate, apices acute to attenuate, abaxial faces subvillous to pilosulous or glabrate, adaxial faces strigillose to glabrate or glabrous; heads 20–40–(80+) in open to congested corymbiform-paniculiform aggregations 8–12–(20+) cm across; peduncles densely hirsutulous to pilosulous, sometimes also stipitate-glandular, 2–12–(25) mm long; involucre cylindric-campanulate to hemispheric; phyllaries mostly 18–35, the outer lance-ovate to ovate, 1–2 mm long, the inner stramineous to purplish, lance-linear to linear, 3–5–(7) mm long, abaxially pilose to puberulent or glabrate, margins weakly, if at all, scarious-translucent, not shiny and undulate when dry, sometimes ciliolate or erose, tips sometimes membranous, obtuse-rounded to acute or attenuate; paleae stramineous, scarious, cuneate to obscurely lance-setaceous, 2–5.5 mm long overall, lacerate or trifid with a setaceous middle lobe; pistillate florets mostly 8–21 in one series, corollas white to ochroleucous, tubes stout to very slender, sparsely to densely pilosulous or hirsutulous, 1.5–5 mm long, laminae wanting or linear to ovate, 1–6–(8) mm long,

sometimes deeply bifid; bisexual florets 20–40(12–80), corollas yellow, tubes 1.5–2.5 mm long, wholly glabrous or distally hirtellous, throats 1.3–2.2 mm long, wholly glabrous or proximally sparsely hirtellous, lobes 0.1–0.7 mm long, glabrous or sparsely hirtellous; style branches 0.8–1.1 mm long; cypselae 1–1.5 mm long; pappus bristles 2.5–5 mm long; $2n = 16$.

Usually in damp places such as seeps and streambanks in Tropical Rain, Lower Montane Rain, Montane Rain, Evergreen Cloud, Seasonal Evergreen, Pine-Oak-Liquidambar, and Pine-Oak forests; common in Northern Highlands, on Central Plateau, and in Sierra Madre, uncommon in Eastern Highlands; (300–)1200–2800 m. Eastern Mex. (Tam., S.L.P., Hgo., Pue., Ver., Oax., Chis.), Guat., Hond., Salv., Nic. CHIAPAS COLLECTIONS: *Cb* 1830 (CAS); *GS* 147 (CAS); *GE* 1761 (CAS); *GG* 578 (CAS, TEX); *He* 644 (CAS); *He* 1281 (TEX); *EM* 709 (US); *EM* 2018 (US); *EM* 2951 (US) *EM* 5046 (CAS, LL); *EM* 5080 (CAS, LL); *Nee* 32354 (TEX); *RM* 368 (CAS); *RM* 447 (CAS); *R&B* 19997 (DS); *SC* 471 (CAS, TEX); *SR* 804 (CAS, TEX); *S&S* 2191 (NY); *T* 695 (DS); *T* 806 (CAS); *T* 2107 (DS); *T* 2249 (DS); *T* 2317 (DS); *T* 3574 (DS); *T* 3860 (DS, LL); *T* 3919 (DS); *T* 3969 (DS); *T* 9562 (CAS, TEX); *T* 9643 (TEX); *TW* 2424 (LL); *Z* 784 (DS); *Z* 846 (DS); 6727; 9290; 9313; 9487; 15283; 16166; 24160; 31647; 31786; 34419; 34573; 34810; 36655; 41959; 42574; 42797; 47662; 48818; 49851; 50006; 50186; 50415; 50547; 50584; 50661; 50852; 52993; 56928; 58069; 58112; 58138; 58410; 58489; 58526; 67011; 68734.

The taxon treated here as *Schistocarpha bicolor* has been variously divided (cf. synonymy) on differences (singly and in combination) in hairiness of stems and leaves; wingedness of petioles; numbers, lengths, hairiness, and tip-shape of phyllaries; numbers of florets per head; and degree of development of laminae of ray-floret corollas. Although some of the extreme facets or modes of the polymorphic continuum are indeed distinctive, all of these characters vary capriciously and independently. I have seen intermediate specimens that link all of the named extremes. Some, but not all, of the intermediates that I checked had low pollen stainabilities, e.g., *E. Matuda* 5080 (ca. 0%) and *D. E. Breedlove* 31786 (100%), 42797 (98%), 58112 (20%), and 58138 (7%).

2. *Schistocarpha eupatorioides* (Fenzl) Kuntze, Revis. gen. pl. 3:170. 1898.

— *Neitrechia eupatorioides* Fenzl, Denkschr. Kaiserl. Akad. Wiss., Math.-Naturwiss. Kl. 1:258. 1850. — TYPE: Peru, near Cuchero, *E. F. Poeppig* 74 (not seen).

[*Neurolaena* (*Schistocarpha*) *lindenii* Schultz-Bip. ex A. Gray, Proc. Amer. Acad. Arts 5:185. 1861. — nom. nud.]

[*Schistocarpha lindenii* Schultz-Bip. ex Donn.Sm, Enum. pl. guat. 1:24. 1881. — nom. nud.]

Zyconia oppositifolia Kuntze, Revis. gen. pl. 1:373. 1891. — *Schistocarpha oppositifolia* (Kuntze) Rydb. in N. L. Britton et al., N. Amer. fl. 31:306. 1927. — TYPE: Venezuela, La Guayra, *O. Kuntze s.n.* (NY).

Schistocarpha hoffmannii Kuntze, Revis. gen. pl. 3:170. 1898. — TYPE: Bolivia, Rio Juntas, 2600 m, *O. Kuntze s.n.* (NY; isotypes: NY).

ILLUSTRATION: none found.

Coarse perennials or suffrutices, to 1(–2) m high, sometimes flowering first year; stems often mottled, closely hirtellous to villous or glabrate; leaves subsessile or with cuneately winged petioles to 25(–50) mm long, blades lance-ovate to ovate-deltate, mostly 6–15(–20) cm long, 3–12+ cm wide, bases broadly cuneate to subtruncate, margins subentire to remotely serrate, apices acuminate to attenuate, abaxial faces subvelutinous to pilosulous or glabrate, adaxial faces strigillose or scabrellous to glabrate; capitulescences of 20–50 heads in congested, corymbiform to paniculiform, clusters 6–15 cm across; peduncles 2–8(–15) mm long, usually densely hirtellous or pilosulous, sometimes stipitate-glandular as well; involucre campanulate to obconic or hemispheric; phyllaries mostly 20–30, the outer greenish, lance-ovate to lanceolate, 1–2 mm long, the inner more stramineous, lance-linear to linear, 3–8 mm long, mostly glabrous and with shiny, undulate, scariouso-translucent, often ciliate margins, tips blunt to acute; paleae stramineous, scarious, obscurely lance-attenuate to setaceous, 4–6+ mm long overall, lacerate; pistillate florets ca. 30–70 in 3–4+ series, corollas pale yellow to greenish or ochroleucous, tubes filiform, 3.5–5 mm long, pilosulous, laminae narrow, 0–1

mm long, entire or deeply cleft; bisexual florets 5–12(–18), corollas yellow, tubes very slender, 2.5–3 mm long, throats very narrowly funnelliform, ca. 2 mm long, lobes narrowly deltate, ca. 0.5 mm long, papillate to pilosulous; style branches 0.8 mm long; cypselae 1–1.5 mm long; pappus bristles 4–5 mm long; $2n = 16$.

Wooded slopes, along ravines and in canyons, often ruderal, in Tropical Rain, Lower Montane Rain, Montane Rain, Seasonal Evergreen, Tropical Deciduous, and Pine-Oak forests; common in Northern and Eastern highlands, rare or uncommon on Central Plateau and in Central Depression; 120–1250 m. Eastern Mex. (Tam., S.L.P., Ver., Chis.); through C.A.; S.A. (Col., Ven., Ecu., Peru, Bol.). CHIAPAS COLLECTIONS: *Calz 3398* (TEX); *C 58* (DS); *C 222* (CAS); *CC 1522* (DS); *Mz 10647* (TEX); *Mz 11007* (TEX); *Prat 957* (CAS, TEX); *T&L 40529* (DS); *BLT 15442* (TEX); *VQ 2294* (TEX); *TW 2418* (TEX); *10372*; *11840*; *13579*; *20261*; *21938*; *23886*; *26466*; *27834*; *27898*; *28077*; *28796*; *39985*; *45920*; *45995*; *46798*; *46889*; *56454*.

61. SCHKUHRIA

Schkuhria Roth, Catal. bot 1:116. 1797. *nom. cons.* — TYPE: *Schkuhria abrontanoides* Roth.
For synonymy, see Heiser, 1945, and Rydberg, 1914.

Erect to spreading annuals, rarely more than 5 dm high, sparsely strigillose to hispidulous and, often, with very short, distally inflated hairs, sometimes glabrescent, the stems, leaves, and phyllaries usually glandular punctate; leaves opposite proximally, becoming alternate distally, \pm petiolate, blades linear or pinnately to bipinnately divided into 3–7+ linear to filiform lobes; capitulescences loosely cymiform to paniculiform; involucre narrowly obconic-obpyramidal to broadly turbinate or hemispheric, 3–5(–9) mm high, each often subtended by a calyculus of 1–3 lanceolate bractlets; phyllaries 4(–6+) in \pm 2 series, often purple or purple-margined, narrowly oblanceolate to obovate, weakly carinate, scarious-margined; receptacles alveolate; paleae none; ray florets 0–6, pistillate, fertile, corollas yellow to white, laminae narrowly ovate to cuneate, usually inconspicuous; disc florets 2–8(–40), bisexual, fertile, corollas yellow, sometimes tipped with red, tubes glandular-puberulent, shorter than the dilated throats, lobes 5, equal to subequal, rather stout, deltate; style branches short, appendages minute, deltate; cypselae obpyramidal, quadrate, hispidulous to villous, especially on angles and toward the bases, rarely glabrescent; pappi of 8(+), scarious, often dorsally hispidulous, scales, some, all, or alternate ones aristate; $x = 8, 10, 11$.

Four, or perhaps only one, species; southwestern United States south through Mexico into Central America, disjunct to South America; closely related to *Achyropappus* Kunth and *Bahia* Lag.

REFERENCES: HEISER, C. B., Jr., 1945. A revision of the genus *Schkuhria*. Ann. Missouri Bot. Gard. 32:265–278.; RYDBERG, P. A., 1914. *Tetracarpum* and *Cephalobembix*. In N. L. Britton et al., N. Amer. fl. 34: 44–47; TURNER, B. L. 1996. Taxonomy and nomenclature of *Schkuhria pinnata* (Asteraceae, Helenieae). Phytologia 79:364–368.

1. *Schkuhria pinnata* (Lam.) Kuntze ex Thell., Repert. Spec. Nov. Regni Veg. 11:308. 1912.

— *Pectis pinnata* Lam., J. Hist. Nat. 2:150. pl. 31. 1792.
— TYPE: Cultivated in Paris; seed apparently from Central America; no specimen seen; plate is diagnostic.

Schkuhria abrontanoides Roth, Catal. bot. 1:116. 1797. — TYPE: No specimen cited; later (Catal. bot. 2:116. 1800), Roth cited: C. Schkuhr, Bot. Handb. tab. 250.b. 1802, which is excellent; use of this name here is based on the illustration.

Mieria virgata La Llave & Lex., Nov. veg. descr. 2:9. 1825.
— *Schkuhria virgata* (La Llave & Lex.) DC., Prodr.

5:654. 1836. — TYPE: “Habitat ad colles Tacubaya et aliis in locis Mexico vicinis.” *P. La Llave s.n.* (G-DC?, IDC microfiche!)

Hopkirkia anthemoidea DC., Prodr. 5:660. 1836. — *Schkuhria anthemoidea* [anthemoides](DC.) J. M. Coul. in J. Donnell Smith, Enum. pl. guatem. 4:93. 1895, illeg., non Weddell 1856. — TYPE: “in Mexici agro Regiomontano legit cl. Haenke” (PR?; G-DC, IDC microfiche).

Tetracarpum guatemalense Rydb. in N. L. Britton et al., N. Amer. fl. 34:45. 1914. — *Schkuhria guatemalensis* (Rydb.) Standl. & Steyer., Publ. Field Mus. Nat. Hist., Bot. Ser. 22:319. 1940. — TYPE: Guatemala, Llano de San Juan de Dios, 1865, K. G. Bernoulli 135 (NY).

For fuller synonymy, see Heiser (1945), Rydberg (1914), and Turner (1996). As treated here, this species includes species 1 and 2 of Heiser and species 1 through 7 (of *Tetracarpum*) of Rydberg.

ILLUSTRATION: Fig. 45.

Usually strictly erect, to 4(–7) dm high; leaves mostly 2–4 cm long, blades linear or parted into 3–7+ linear to filiform lobes, puberulent and glandular-punctate; peduncles slender, mostly 1–5 cm long; involucre narrowly turbinate to obconic or obpyramidal, 4–6 mm high, often each subtended by a calyculus of 1–3 lanceolate bractlets; phyllaries 4–6, green to purple, oblanceolate to obovate, scarious-margined, weakly carinate, glandular-punctate, usually puberulent as well; ray florets 0–2, corollas yellow to white, inconspicuous, laminae 1–3 mm long; disc florets 4–6(2–9), corollas yellow, ca. 2 mm or less long;

cypselae blackish to buff, 3–4 mm long, hispidulous to villous, especially on the angles; pappi of 8, white to tawny or purplish scales, obovate-rounded to lance-aristate in various combinations, mostly 1–3 mm long; $n = 20$.

Pastures and wooded slopes in Seasonal Evergreen and Pine-Oak forests, in disturbed forests, and in Savanna; uncommon to common on Central Plateau and in Sierra Madre, rare in Central Depression; 830–1900 m. Southwestern U.S. (Calif. to Tex.); southern Mex. (Son., Chih., Dgo., Zac., S.L.P., Nay., Jal., Aguasc., Gto., Hgo., Mich., Méx., D.F., Pue., Ver., Gro., Oax., Chis.), Guat., Hond., Salv., Nic.; S.A. (Col., Ven., Ecu. to Braz., Arg., Urag.). CHIAPAS COLLECTIONS: *T* 9409 (TEX); 6027; 21093; 27023; 28439; 37857; 40199; 40540; 41877; 46055; 52731; 54922.

62. SCLEROCARPUS

Sclerocarpus Jacq., Icon. pl. rar. 1:17, tab. 176. 1781. — TYPE: *Sclerocarpus africanus* Jacq. ex Murray.

Annual or perennial herbs, rarely suffrutescent, to 6(–20) dm high; leaves mostly opposite (at least the proximal), petiolate to subsessile, blades mostly ovate to lanceolate, typically triplinerved from near their bases, margins usually entire or serrate, rarely dissected, faces strigose or glabrous; heads borne singly at ends of branches, usually on long peduncles; involucre various shapes, mostly less than 15 mm high; phyllaries 5–8(–15+) in 1–2 series, reduced and linear to broadly foliaceous; receptacles irregularly hemispheric to conical; paleae each closely investing the base of a subtended floret, becoming a smooth to tuberculate or wrinkled, often beaked, indurate, strigose to hispid perigynium; ray florets (0)–5–8+, neuter, corollas sometimes caducous, yellow to orange, tubes usually long and slender, laminae orbicular to broadly elliptic or ovate, tubes and abaxial surfaces of laminae often strigose; disc florets 10–50+, bisexual, fertile, or innermost apparently functionally staminate, corollas pale yellow to orange, often with red to purple papillae marking faces of lobes, tubes 5-nerved, ca. 1/8 as long as the nearly cylindric throats, lobes 5, lance-linear, throats and lobes often strigose; style branches mostly slender, tapered, hispidulous; cypselae (inside perigynia) blackish to dark brown or green, obliquely obovoid to arcuate, somewhat flattened laterally, minutely striate, glabrous; pappi none or short coronas of free or united squamellae or bristles; $x = 12$.

About 8 species; all but *S. africanus* are New World. Members of the genus are found from central Texas and Baja California Peninsula south and east through Mexico, West Indies, and Central America to northern South America.

REFERENCE: FEDDEMA, C. 1972. *Sclerocarpus uniserialis* (Compositae) in Texas and Mexico. *Phytologia* 23:201–209.

- a. Phyllaries ovate to broadly lance-elliptic, subsessile or nearly so; outermost perigynia beakless or nearly so 1. *S. divaricatus*
- aa. Phyllaries lance-linear to narrowly spatulate or with obovate laminae borne on slender, petiole-like bases; beaks of outermost perigynia 2–5 mm long.
 - b. Leaf blades mostly lanceolate to narrowly trullate; disc corollas 9–12 mm long; pappi low crowns 3. *S. uniserialis*
 - bb. Leaf blades mostly ovate to lance-ovate; disc corollas ca. 5 mm long; pappi none 2. *S. phyllocephalus*

1. *Sclerocarpus divaricatus* (Benth.) Benth. ex Hemsl. in F. Godman and O. Salvin, Biol. cent.-amer., Bot. 2:164. 1881.

— *Gymnopsis divaricata* Benth., Bot. Voy. *Sulphur* 116. 1845. — TYPE: Central America, Gulf of Fonseca (not seen).

Sclerocarpus orcuttii Greenm., Publ. Field Columbian Mus., Bot. Ser. 2:346. 1912. — TYPE: Mexico, Colima, Colima, 24 Oct 1910, C. R. Orcutt 4599 (F)

ILLUSTRATION: Fig. 46.

Annuals, 2–5(–15) dm high; petioles 15–30(6–50) mm long, leaf blades mostly ovate to broadly trullate or subdeltate, rarely narrower, mostly 3–7 cm long, margins very coarsely toothed or, rarely, subentire, faces unevenly strigillose to strigose; peduncles 1–6(–12) cm long; involucre campanulate at anthesis, later saucer-shaped; phyllaries 5(–6+), subsessile or nearly so, green, herbaceous, ovate to broadly lance-triangular, 8–12 mm long, strigose to strigillose; receptacles \pm hemispheric, pubescent; paleae becoming bulbous-based, strigose-hispid and tuberculate perigynia, the outermost \pm hooded, the inner becoming terete-beaked, 3–5 mm long (innermost ones often cucullate-terete distally, to ca. 9 mm long); ray florets 5(–7+).

corollas yellow to orange, tubes 4–7 mm long, laminae ovate elliptic, 5–12 mm long; disc florets ca. 8–30, corollas yellow, often purplish-banded distally, very slender and barely dilated distally, tubes only 0.5 mm long, throats 9–10 mm long, lobes lance-linear, ca. 2.5 mm long, distal throats and lobes abaxially hispidulous, each lobe with a band of purplish papillae adaxially; style branches ca. 2.5 mm long; cypselae ca. 4 mm long; pappi none; $2n = 24$.

Open places along streams and trails in Seasonal Evergreen and Tropical Deciduous forests and in Mangrove Swamps; uncommon in Central Depression and Sierra Madre and on Pacific Coastal Plain; 3–900 m. Western and southern Mex. (B.C.S., Chih., Nay., Jal., Cma., Mich., Ver., Yuc., Chis.); Guat., Salv., Hond., Nic., C.R., Pan.; S.A. (Col.). CHIAPAS COLLECTIONS: *C 463* (DS); *Fed 1580* (TEX); *Fi 35200* (LL); *RMK 3126* (TEX); *RMK 3440* (TEX, UC); *L 1297* (DS); *L 2906* (DS); *Prat 1101* (TEX); *SI 2387A* (TEX); *T 2989* (DS); *Ve 307* (CAS, TEX); *Ve 2147* (TEX); 20789; 28322; 28565; 36819; 37360; 46682; 52131.

2. *Sclerocarpus phyllocephalus* S. F. Blake, Contr. U.S. Natl. Herb. 24: 27, t. 8. 1922.

— TYPE: Guatemala, Izabal, at Cristina, 23 May 1919, S. F. Blake 7642. (US)

ILLUSTRATION: see protologue.

Erect annuals, to 6+ dm high; petioles 2–5+ mm long, leaf blades mostly ovate to lance-ovate, 2–4(–8) cm long, margins remotely serrate, faces strigose; peduncles 1–6+ cm long; involucre often subtended by leafy bracts; outer phyllaries green, leaflike with petiolar bases and spatulate to obovate laminae, 6–20 mm long, strigose; receptacles low-conic, 2–3 mm high; paleae forming greenish to stramineous, bulbous-based, terete-beaked, tuberculate, often geniculate, strigoso-hispid perigynia 5–9 mm long including beaks; ray florets 5–7, corollas yellow to orange, often caducous, tubes ca. 2 mm long, laminae suborbicular, 4–7 mm long; disc florets 9–15+, corollas greenish yellow, tubes ca. 0.3 mm long, throats ca. 3.5 mm long, lobes ca. 1 mm long; style branches ca. 1 mm long; cypselae ca. 3.5 mm long; pappi none.

Single Chiapas collection: Dry flats with *Sabal* and Tropical Deciduous Forest in Central Depression at 900 m (D. E. Breedlove 42362). Southern Mex. (Chis.); Guat., Hond.

3. *Sclerocarpus uniserialis* (Hook.) Benth. ex Hemsl. in F. Godman and O. Salvin, Biol. cent.-amer., Bot. 2:164. 1881.

— *Gymnopsis uniserialis* Hook., Icon. pl. 2:t. 145. 1837.

— *Aldama uniserialis* (Hook.) A. Gray, Boston J. Nat. Hist. 6:228. 1850. — TYPE: Texas, Austin Co., San Felipe, T. Drummond 135 “bis ... Texas II” (fide Feddema 1972) (K; isotypes: GH, K, NY).

Sclerocarpus major Small, Fl. southeast. U.S. 1250. 1903. — TYPE: Texas, Bexar Co., Comale Creek, 1847–1848, F. J. Lindheimer 432 (NY; isotypes F, GH, MO, NY, US).

Sclerocarpus frutescens Brandegee, Univ. Calif. Publ. Bot. 4:281. 1912. — *Sclerocarpus uniserialis* (Hook.) Benth. ex Hemsl. var. *frutescens* (Brandegee) Feddema, Phytologia 23:206. 1972. — TYPE: Mexico, San Luis Potosi, between Bagre and Minas de San Rafael, Jul 1911, C. A. Purpus 5157 (UC!; isotypes: F, GH, MO)

ILLUSTRATION: see synonymy.

Spreading annuals, sometimes persisting, 3–8(–20) dm high; petioles 3–15(–25) mm long, leaf blades narrowly lanceolate to lance-ovate or trullate, 3–6(–9+) cm long, 5–20(–55) mm wide, margins coarsely serrate to subentire, faces sparsely to densely strigose; peduncles 2–6(–12) cm long, weakly fistulose; phyllaries 5–6(–12), lance-linear to oblanceolate or spatulate, 3–9(–15) mm long, strigose, obscurely petiolate at base; receptacles conical, to 10 mm high, glabrous or nearly so; paleae becoming greenish to stramineous, bulbous-based, straight or bent, ribbed or wrinkled, terete-beaked, strigoso-hispid perigynia 6–9+ mm long (including beaks); ray florets 5(–9), corollas yellow to orange, often caducous, tubes 3–5+ mm long, laminae ovate to orbicular, 6–18(–30+) mm long; disc florets 10–25(–50), sometimes the innermost functionally staminate, corollas yellow to orange, often purplish to red on lobes, rarely reddish throughout, tubes 0.5 mm long, throats 6–7(–9) mm long, lobes ca. 2.5 mm long; style branches ca. 2.5 mm long; cypselae 3–4+ mm long; pappi erose coronas ca. 0.5 mm high; $2n = 24$.

Open, often disturbed, places in Tropical Deciduous Forests; common in Central Depression, rare on Pacific Coastal Plain; (250–)530–1170 m. Tex., eastern and southern Mex. (Coah., N.L., Tam., S.L.P., Pue., Gro., Ver., Oax., Chis.), Guat. CHIAPAS COLLECTIONS: *L 1636* (DS); *Pa 1313* (CAS); *Pa 1314* (CAS); *BV 64-2* (DS); 11782; 13245; 13368; 13888; 19997; 26905; 46419; 70159.

63. SIGESBECKIA

Sigesbeckia L., Sp. pl. 900. 1753. — LECTOTYPE: (M. L. Green, Prop. Brit. Bot. 183. 1929): *Sigesbeckia orientalis* L.

Annual or perennial herbs, to 1(–2) m high, some prostrate-creeping and rooting at nodes; leaves opposite, petiolate to sessile, petioles commonly winged, bases clasping, blades deltate to trullate, ovate, or lanceolate, triplinerved from near their bases, margins serrate to coarsely toothed, faces sparsely to densely pubescent with multicellular, often long, pointed hairs; heads borne singly and axillary or terminal to grouped in corymbiform associations; peduncles slender, often recurved or crozierlike, densely hairy with both stipitate-glandular and multicellular-pointed hairs; involucre markedly biseriate, outer phyllaries mostly 5, linear-filiform to spatulate, spreading to reflexed or erect, usually stipitate-glandular, often with other hairs as well, rarely glabrous, inner phyllaries 5–8, mostly navicular, stipitate-glandular or glabrous, each \pm infolding a subtended floret, apices somewhat cucullate; receptacles convex to conical, very small; paleae resembling inner phyllaries but narrower; ray florets usually 5–13, rarely none, pistillate, fertile, corollas yellow-orange to whitish or purplish, tubes hairy, laminae flabellate to oblong, glabrous

or resinous-gland-dotted; disc florets mostly 10–30(–60), bisexual and fertile or functionally staminate, corollas pale yellow to orange, tubes 0.8–2 times as long as the abruptly dilated, campanulate to cylindric throats, lobes 5, equal; style branches slender, minutely papillate, ca. 0.5 mm long, stigmatic nearly to tips or, exceptionally, astigmatic; cypselae blackish, obpyramidal and strongly quadrate to somewhat compressed and rounded, finely striate, glabrous, rarely mottled or warty; pappi none; $x = 15$.

Perhaps a dozen species, primarily of Tropical America with a second center in Africa; one species a pantropical weed. Closely allied with *Rumfordia*, *Smallanthus*, and, especially, *Trigonospermum*.

REFERENCES: HUMBLER, J. E. 1972. Observations on the genus *Sigesbeckia* L. *Ciencia y Naturaleza* 13:2–19; MCVAUGH, R. and C. ANDERSON. 1972. North American counterparts of *Sigesbeckia orientalis* (Compositae). *Contr. Univ. Michigan Herb.* 9:485–493; TURNER, B. L. 1978. New species and combinations in the genera *Sigesbeckia* and *Trigonospermum* (Compositae: Melampodiaceae). *Brittonia* 30:64–68.

- a. Outer phyllaries 5–10(–18) mm long, stipitate-glandular, rarely with longer, pointed hairs; anthers greenish; cypselae 2–3 mm long, rounded to weakly 4-angled, obovoid, often arcuate. 2. *S. jorullensis*
 aa. Outer phyllaries 3–8(–10) mm long, stipitate-glandular and long-pilose; anthers yellow; cypselae 1.5–2.3 mm long, sharply 4-angled to rounded-quadrate, mostly straight 1. *S. agrestis*

1. *Sigesbeckia* [*Siegesbeckia*] *agrestis*
 Poepp., Nov. gen. sp. pl. 3:45. pl. 256.
 1843.

— TYPE: Origin apparently Peru; no specimen seen; use of this name here is based on the illustration; see discussion by McVaugh and Anderson (1972).

ILLUSTRATION: Fig. 47.

Annual or short-lived perennial herbs, 5–8(–20?) dm high; proximal leaves petiolate, the distal subsessile, petioles to 25+ mm long, winged, to 10 mm wide, blades mostly trullate to rounded-rhomboid, 5–12 cm long, 3–8 cm wide, margins coarsely toothed to serrate, apices acute to acuminate, abaxial faces commonly resinous gland-dotted; heads terminal, borne singly, overtopped by upper branches, ultimately ca. 3–20 in loose, corymbiform clusters; peduncles very slender, often uncinat, mostly 1–2(–5) cm long; outer phyllaries 5, linear-spatulate, reflexed, mostly 3–8(–10) mm long, bearing stipitate-glandular hairs 0.2–0.4 mm long and eglandular, pointed hairs 0.5–1.5 mm long, inner phyllaries 5–8, stipitate-glandular; receptacles ca. 1 mm high; paleae similar to inner phyllaries; ray florets 5–8(–13), corollas yellow or orange to ochroleucous or purplish, tubes 0.3–0.7 mm long, pubescent, laminae oblong to flabellate, 1–4 mm long; disc florets 8–15(–35), corollas yellow to orange or ochroleucous, ca. 1.5 mm long, tubes pubescent, 0.4–0.7 mm long, throats glabrous, abruptly dilated, 0.7–1.2 mm long, lobes deltate-ovate, 0.3–0.4 mm long; anthers pale yellow; style branches apically narrowed, minutely papillate, stigmatic almost to tips; cypselae purplish black, sometimes mottled with brown, obpyramidal, sharply 4-angled to rounded-quadrate, mostly straight, 1.5–2.3 mm long, finely striate, glabrous; pappi none; $2n = 30, 60$.

Moist slopes and canyons in Montane Rain, Pine-Oak, and Pine-Oak-*Liquidambar* forests; uncommon on Central Plateau and in E Sierra Madre; 1500–2300 m. Mex. (Sin., Jal., Mich., Méx., Gro., Oax., Chis.); Guat., Salv., C.R.; Antill.; S.A. (Col., Peru). CHIAPAS COLLECTIONS: C&L 596 (CAS); EM 747 (MICH, US); 12551; 16149; 22644; 40259; 46170, 65617, 69783.

2. *Sigesbeckia* [*Siegesbeckia*] *jorullensis*
 Kunth, Nov. gen. sp., ed. fol. 2:223. 1820
 [1818]; ed. qto. 4:284. 1820.

— TYPE: Mexico, “Volcán de Jorullo” (see discussion by McVaugh and Anderson 1972), *A. von Humboldt and A. J. A. Bonpland s.n.* (P, microfiche!)

Siegesbeckia cordifolia Kunth, Nov. gen. sp., ed. fol. 4:222. 1820 [1818]; ed. qto. 4:283. 1820. — TYPE: Colombia, near Bogotá, “prope Sanctae Fidei,” *A. von Humboldt and A. J. A. Bonpland s.n.* (P, microfiche!).

Polymnia odoratissima Sessé & Moc., Pl. nov. hisp. 148. 1887 [1890]. — TYPE: Mexico, Morelos, “Ayacapixtla et Tlaltenanco,” *M. Sessé and J. M. Mociño* 3974 (MA; isotype: F).

See McVaugh and Anderson (1972) for discussion of types and synonymy.

ILLUSTRATION: Ann. Missouri Bot. Gard. 62:1134. 197 [Fl. Pan.].

Perennials, often flowering first year, 3–8(–15+) dm high; proximal leaves petiolate, the distal subsessile, petioles to ca. 5 cm long, winged, (2–)4–16 mm wide, often auriculate or clasping at their bases, blades rounded-deltate to cordate, trullate, or broadly lanceolate, 3–8(–12) cm long, 2–6(–10) cm wide, margins remotely serrate to coarsely toothed, faces sparsely to densely pilose or scabrelous with multicellular hairs, usually not resinous gland-dotted; heads in open to congested, compound corymbiform aggregations; peduncles very slender, often uncinat or crozierlike, mostly 1–3 cm long, densely stipitate-glandular; outer phyllaries 5, spreading to reflexed, linear, apically spatulate, 5–10(–18) mm long, bearing stipitate-glandular hairs 0.4–0.7 mm long, very rarely with shorter, pointed, eglandular hairs as well, inner phyllaries ca. 8, green to purplish, somewhat navicular and each infolding a subtended floret, ca. 3 mm long, stipitate-glandular; receptacles to 2 mm high; paleae similar to inner phyllaries; ray florets 5–8, corollas yellow to ochroleucous with purplish nerves to purplish throughout, tubes 0.8–1 mm long, pubescent, laminae flabellate, ca. 2 mm long, glabrous; disc florets 10–30, corollas ochroleucous to greenish yellow, 2.1–2.6 mm long, tubes very

slender, ca. 1 mm long, pubescent with multicellular hairs, throats abruptly dilated, ca. 0.5 mm long, the limbs glabrous, lobes lance-deltate, ca. 0.5 mm long; anthers greenish; style branches apically narrowed, minutely hispidulous-papillate, stigmatic almost to tips; cypselae purplish black, obovoid to obpyramidal, 2–3 mm long, rounded weakly 4-angled, somewhat compressed, often arcuate, striate, glabrous; pappi none; $2n = 30, 60$.

Moist slopes etc. in Montane Rain, Evergreen Cloud, Pine-Oak-Liquidambar, and Pine-Oak forests; common on Central Plateau, uncommon in E Sierra Madre; 1370–2880 m.

Mex.(Chih., Dgo., Jal., Hgo., Mich., Mex., D.F., Mlos., Pue., Ver., Gro., Oax., Chis.); Guat., C.R., Pan.; Antill.; S.A. (Col., Ven., to Chile, Arg.). CHIAPAS COLLECTIONS: *Cro* 47292 (MO, UC); *GG* 248 (CAS, TEX); *GG* 311 (TEX); *Hufi* 2205 (TEX); *L* 116 (DS, LL); *L* 531 (DS); *L* 1039 (DS); *L* 2479 (DS); *EM* 4606 (F, LL); *Prat* 1127 (CAS); *SI* 2145 (TEX); *SI* 3108 (TEX); *SI* 3137 (TEX); *T* 3884 (DS); *T* 397 (DS); *T* 463 (DS, LL); *T* 530 (DS, LL); *T* 1045 (DS); *T* 1279 (DS, LL, TEX); *T* 1364 (DS); *T* 9443 (TEX); *W&R* 254 (TEX); 6705; 7004; 7970; 12330; 12602; 12728; 12951; 13746; 31059; 31735; 41113; 42577; 51935; 62113.

64. SIMSIA

Simsia Pers., Syn. pl. 2:478. 1807. — *Encelia* Adans. sect. *Simsia* (Pers.) A. Gray, Proc. Amer. Acad. Arts 8:656. 1873. — LECTOTYPE: (Robinson and Brettell 1972:364): *Simsia amplexicaulis* (Cav.) Pers. = *Coreopsis amplexicaulis* Cav.
Armania Bertero ex DC., Prodr. 5:576. 1836. — TYPE: *Armania fruticulosa* (Spreng.) Bertero ex DC. = *Hopkirkia fruticulosa* Spreng. = *Simsia fruticulosa* (Spreng.) S. F. Blake.
Barrattia A. Gray & Engelm. ex A. Gray, Proc. Amer. Acad. Arts 1:48. Dec 1846 to Jan 1847 (fide Tax. Lit., ed. 2.). — TYPE: *Barrattia calva* A. Gray & Engelm. ex A. Gray = *Simsia calva* (A. Gray & Engelm. ex A. Gray) A. Gray.

Annuals or perennials, sometimes suffrutescent or shrubby, mostly 5–25+ dm high; leaves opposite throughout or the distal alternate, all petiolate or the distal sessile, petioles often winged and/or basally dilated to form amplexicaul auricles, the auricles sometimes connate, blades lance-linear to broadly deltate or ovate, usually 3–5-nerved from near their bases, often trilobate, exceptionally palmatifid or pinnatifid, margins serrate to crenate or dentate, faces variously pilose to hispid and/or glandular-puberulent, not glabrous; heads rarely borne singly, mostly 3–12+ in cymiform clusters, the clusters often aggregated into paniculiform associations; peduncles usually slender, often bracteolate, often piloso-hispid and/or glandular-puberulent; involucre campanulate to cylindric or hemispheric, mostly 8–14 mm high; phyllaries mostly 15–21(–40+) in 2–4 series, subequal or strongly unequal, herbaceous to cartilaginous, lance-linear to lance-ovate, often pilose and/or hirtellous and/or glandular-puberulent; receptacles slightly convex, often fistulose; paleae persistent, scarious to indurate, conduplicate, often carinate, acuminate to mucronate; ray florets none or 8–20(–40+), neuter, corollas pale yellow to orange or purple to red, pink, or white, tubes very slender, glandular-puberulent, laminae narrowly to broadly oblong to ovate; disc florets mostly 12–50(–150+), bisexual, fertile, corollas ochroleucous to yellow or orange or purplish (distally or throughout), tubes glandular-pubescent, much shorter than the abruptly ampliate, cylindrical throats, lobes 5, deltate to narrowly triangular; style branches very slender, hirsutulous; cypselae black or brown, often mottled, usually strongly flattened (on exception, biconvex), obovate to oblong in outline, glabrous or subsericeous to appressed-pubescent; pappi none or of 2, fragile or caducous, scabrellous awns, sometimes with additional squamellae; $x = 17$.

Some 18 or so species; southwestern United States (Ariz., Tex.) through Mexico, Central America, and Antilles into South America (to Peru, Arg.). Very closely allied with *Viguiera*.

REFERENCES: BLAKE, S. F. 1913. A revision of *Encelia* and some related genera. Proc. Amer. Acad. Arts 49:346–396; ROBINSON, H. and R. D. BRETTELL. 1972. A survey of the Mexican and Central American species of *Simsia*. Phytologia 24:361–377; SPOONER, D. M. 1990. The systematics of *Simsia* (Compositae: Heliantheae). Syst. Bot. Monogr. 30:1–90.

- a. Coarse annuals, perhaps persisting; phyllaries subequal, outer nearly as long as the inner.
 - b. Leaves usually antrorsely strigose and little, if at all, glandular-puberulent; paleae 7–9 mm long; ray corolla laminae 8–16 mm long 1. *S. amplexicaulis*
 - bb. Leaves glandular-pubescent and with patent to antrorse hairs; paleae (7–)9–11+ mm long; ray corolla laminae 5–6(–10+) mm long 3. *S. foetida*
- aa. Perennials; phyllaries unequal, the outer less than 2/3 as long as the inner.
 - c. Suffrutesces, rarely largely herbaceous; leaves sericeous to densely pilose abaxially 4. *S. ghiesbreghtii*
 - cc. Herbs, sometimes coarse, woody only at base, if at all; leaves scabrellous and/or hirtellous abaxially.
 - d. Involucres 7–9+ mm high; paleae 7–8+ mm long; ray corollas purple to red, pink, or white 5. *S. sanguinea*
 - dd. Involucres 9–14 mm high; paleae (7–)9–13 mm long; ray corollas yellow.
 - e. Petioles 2–9 cm long, winged at least at base; involucre 9–11 mm high; cypselae (4–)6–7 mm long; pappus awns 2.5–3.5 mm long 2. *S. annectens*
 - ee. Petioles 2–12+ mm long, wingless; involucre 11–14 mm high; cypselae 5–5.5 mm long; pappus awns to 6 mm long 6. *S. villasenorii*

1. *Simsia amplexicaulis* (Cav.) Pers., Syn. pl. 2:478. 1807.

— *Coreopsis amplexicaulis* Cav., Descr. pl. 226. 1802. — *Encelia amplexicaulis* (Cav.) Hemsl. in F. Godman and O. Salvin, Biol. cent.-amer., Bot. 2:183. 1881. — *Simsia schaffneri* Schultz-Bip. ex A. Gray, Proc. Amer. Acad. Arts 19:8. 1883, pro syn. — TYPE: Grown in Madrid from Mexican seed from Sessé and Mociño expedition (MA).

Ximenesia cordata Kunth, Nov. gen. sp., ed. fol. 4:178. 1820 [1818]; ed. qto. 4:228. 1820. — *Simsia cordata* (Kunth) Cass. in F. Cuvier, Dict. sci. nat., ed. 2. 59:137. 1829. — *Encelia cordata* (Kunth) Hemsl. in F. Godman and O. Salvin, Biol. cent.-amer., Bot. 2:183. 1881. — TYPE: "Cresit prope Valladolid de Mechoacan et prope Capula Mexicanorum, alt. 1050 hex. [1890 m]," Sep 1803, A. J. A. Bonpland 2350 (P, microfiche!).

Ximenesia heterophylla Kunth, Nov. gen. sp., ed. fol. 4:178, t. 380. 1820 [1818]; ed. qto. 4:227. 1820. — *Simsia kunthiana* Cass. in F. Cuvier, Dict. sci. nat., ed. 2. 59:137. 1829, nom. nov. — *Simsia heterophylla* (Kunth) DC., Prodr. 5:577. 1836, not Pers. 1807. — *Encelia heterophylla* (Kunth) Hemsl. in F. Godman and O. Salvin, Biol. cent.-amer., Bot. 2:184. 1881. — TYPE: "Cresit prope Zinapequaro Mexicanorum, alt. 960 hex. [1728 m]," Sep 1803, A. J. A. Bonpland 4360 (P, microfiche!; isotype: P).

Helianthus trilobatus Link, Enum. hort. berol. alt. 2:352. 1822. — TYPE: Grown in Berlin from Mexican seed; synonym here *fide* Blake (1917:46) and Spooner (1990:61).

Simsia auriculata DC., Prodr. 5:577. 1836. — *Encelia mexicana* Mart. ex DC., Prodr. 5:578. 1836, pro syn. — *Ximenesia hirta* Mart. ex DC., Prodr. 5:578. 1836, pro syn. — LECTOTYPE: (Spooner 1990:61): Mexico, near Mexico City, 24 Sep 1927, J. L. Berlandier 927 (G-DC, microfiche!; islectotypes: BM, F, FI, G, GH, LE, MO, OXF, P, W).

Helianthus amplexicaulis DC., Prodr. 5:589. 1836. — TYPE: Mexico, "prov. Leonina ad occid. urbis Guanajuato," 1829, Mendez s.n. (G-DC, microfiche!).

Helianthus sericeus Sessé & Moc., Pl. nov. Hisp. 147. 1890. — TYPE: Mexico, Morelos, "Ayacapixtla," M. Sessé and J. M. Mociño s.n. (MA, *fide* Spooner 1990:61).

Simsia foetida (Cav.) S. F. Blake var. *decipiens* S. F. Blake, Proc. Amer. Acad. Arts 49:387. 1913. — *Simsia amplexicaulis* (Cav.) Pers. var. *decipiens* (S. F. Blake) S. F. Blake, Contr. Gray Herb. 52:46. 1917. — TYPE: Mexico, Chihuahua, "SW Chihuahua, Aug–Nov 1885," E. Palmer s.n. [440] (GH; isotypes: K, LE, LL, MEXU, MO, NY, UC!).

ILLUSTRATIONS: Fig. 48; R. McVaugh. 1984. Fl. novo-gal. 12:848.

Erect to spreading annuals (rarely persisting?), 2–12+ dm high, stems sparsely hispid or pilose, sometimes glandular-puberulent; petioles mostly 1–4 cm long, wingless to broadly winged, often basally dilated into amplexicaul auricles, distal leaves often seemingly sessile, leaf blades narrowly lanceolate to ovate or broadly deltate, sometimes with a deep, rounded sinus on each side, 2–15 cm long, 1–14 cm wide, bases cuneate to cordate, margins subentire to coarsely toothed, apices acute to attenuate, abaxial faces sparsely to densely antrorsely strigose with mixed hairs, sometimes including glandular ones, adaxial faces sparsely antrorsely strigose with short, stout, and longer,

finer hairs; heads 6–12 per main stem in loose cymiform aggregations; peduncles mostly 2–10 cm long, pilose and glandular-hispidulous; involucre campanulate to subhemispheric, 8–11 mm high; phyllaries ca. 16–21, dark green to purple, herbaceous, subequal, linear to lanceolate, the outer narrowest, all sparsely to densely pilose and, often, glandular-puberulent and closely hirtellous; paleae stramineous to purple, 7–9 mm long, scarious with stiff, cartilaginous apices, sparsely hairy medially; ray florets 8–15, corollas pale to bright yellow or orange, sometimes distally purple-tinged, tubes 1–2 mm long, laminae ovate to narrowly oblong, 8–16 mm long; disc florets 30–50+, corollas pale to bright yellow, sometimes distally purple, tubes 1–1.5 mm long, throats 3.5–5 mm long, basally hirtellous, lobes narrowly deltate, ca. 1 mm long; style branches ca. 3 mm long; cypselae blackish, often mottled, obovate, 3.5–4.5 mm long, sparsely strigillose or glabrous; pappi none or of 2, scabrelous, often fragile, awns 2–3 mm long; $2n = 34$; flowering mostly Sep–Nov(–Jan).

Ruderal in fields, along roads, and in other disturbed places in Evergreen Cloud, Pine-Oak-Liquidambar, and Pine-Oak forests; common (and locally abundant) in Northern Highlands, on Central Plateau, and in Sierra Madre; (875–)1700–2700 m. Mex. (Chih., Dgo., Coah., S.L.P., Jal., Gto., Qro., Hgo., Mich., Mex., D.F., Pue., Ver., Oax., Chis.), Guat., Hond. CHIAPAS COLLECTIONS: L 111 (DS); L 988 (DS); L 1442 (DS); L 1717 (DS); L 2191 (DS); L 2300 (DS); L 2386 (DS); L 2476 (DS); Spo 2785 (TEX, UC); Spo 2794 (UC); SI 2126 (TEX); SI 2161 (TEX); T 838 (DS, LL); T 1070 (DS); T 1231 (DS); T 1304 (DS); T 1562 (DS); 7296; 8288; 12434; 12502; 12795; 13283; 14424; 19972; 29249; 29291; 39761; 40919; 46303; 71399.

2. *Simsia annectens* S. F. Blake, Contr. Gray Herb. 52:43. 1917.

— LECTOTYPE: (Spooner 1990:37): Mexico, México, Zultepec, Almoya de las Alguisiras, 23 Dec 1904, C. Seler and E. Seler 4472 (GH; isotypes: ENCB, GH).

All Chiapan collections of this species are referable to:

2a. *Simsia annectens* S. F. Blake var. *grayi* (Schultz-Bip. ex S. F. Blake) D. Spooner, Syst. Bot. Monogr. 30:39. 1990.

— *Simsia grayi* Schultz-Bip. ex S. F. Blake, J. Wash. Acad. Sci. 18:26. 1928. — TYPE: Mexico, Oaxaca, Oaxaca, F. M. Liebmans s.n. [561] (P; isotypes: C, GH, US).

ILLUSTRATION: none found.

Perennial herbs, 15–20(–30) dm high, stems closely puberulent with glandular and nonglandular hairs and sparsely setose; petioles 2–9 cm long, narrowly to broadly winged, basally dilated and connate-perfoliate, leaf blades deltate to lance-deltate, 6–15 cm long, 3–9 cm wide, bases subcordate to obscurely hastate, margins coarsely crenate-dentate, apices broadly attenuate, abaxial faces closely hirtellous with stout, erect hairs, adaxial faces similar and with additional, longer, scattered, antrorse hairs; heads in loose cymiform associations of 5–10 at ends of main and axillary stems; peduncles mostly 12–35 mm long, minutely glandular-puberulent and sparsely hispid; involucre campanulo-cylindric, becoming hemispheric, 9–11

mm high; phyllaries 16–22, strongly unequal, green to purplish, herbaceous to cartilaginous, lance-ovate to lance-attenuate, the outer shorter, broader, all glandular-puberulent, distally ciliate; paleae stramineous, (7–)9–10 mm long, scarious with acute to attenuate cartilaginous apices, pilosulous medially, glandular-puberulent distally; ray florets 8, corollas pale yellow, tubes 1.5 mm long, laminae oblong-ovate, 4.5–7.5 mm long; disc florets 20–40, corollas yellow, becoming purplish, tubes ca. 2 mm long, glandular-puberulent, throats narrowly cylindric, 4 mm long, proximally minutely scabrellous, lobes deltate, ca. 1 mm long, abaxially scabrellous and minutely pilose; style branches ca. 2.5 mm long; cypselae gray to brown or blackish, oblong in outline, (4–)6–7 mm long, subsericeous; pappi of 2, slender, scabrellous awns 2.5–3.5 mm long; $2n = 34$; flowering Oct.

Limestone outcrops in Tropical Deciduous Forest; rare in Central Depression; 850 m. Southern Mex. (Mich., Gro., Oax., Chis.). CHIAPAS COLLECTIONS: *Spo* 2788 (TEX, UC); 47040.

3. *Simsia foetida* (Cav.) S. F. Blake, Proc. Amer. Acad. Arts 49:385. 1913.

— *Coreopsis foetida* Cav., Icon. 1:55, t. 77. 1791. — *Simsia ficifolia* Pers., Syn. pl. 2:478. 1807, nom. superfl. — *Ximenesia foetida* (Cav.) Spreng., Syst. veg. 3:606. 1826. — *Encelia foetida* (Cav.) Hemsl. in F. Godman and O. Salvin, Biol. cent.-amer., Bot. 2:183. 1881. — TYPE: Grown in Madrid from Mexican seeds sent by Sessé and Mocino (MA; isotype: MA).

Simsia grandiflora Benth., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 4:92. 1853. — *Encelia grandiflora* (Benth.) Hemsl. in F. Godman and O. Salvin, Biol. cent.-amer., Bot. 2:184. 1881. — *Simsia foetida* (Cav.) S. F. Blake var. *grandiflora* (Benth.) D. Spooner, Syst. Bot. Monogr. 30:70. 1990. — LECTOTYPE: (Spooner 1990: 70): Nicaragua, Volcán el Viejo, 1851, A. S. Oersted 100 (K; isoelectotypes: C, US).

Simsia polycephala Benth., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 4:93. 1853. — *Encelia polycephala* (Benth.) Hemsl. in F. Godman and O. Salvin, Biol. cent.-amer., Bot. 2:184. 1881. — LECTOTYPE: (Spooner 1990:71): Costa Rica (fide Spooner), "Paa tørre Marker i Naerheden af Hac. Santa Rosa og vad Tortuga," A. S. Oersted 160 (K; isoelectotypes: C, US).

Encelia adenophora Greenm., Proc. Amer. Acad. Arts 39:109. 1903. — *Simsia adenophora* (Greenm.) S. F. Blake, Proc. Amer. Acad. Arts 49:388. 1913. — LECTOTYPE: (McVaugh 1984, Fl. novo-gal. 12:850): Mexico, Jalisco, Tequila, Sep–Oct 1893, C. G. Pringle 4602 (GH; isotypes: BM, BR, F, G, GOET, JE, K, LE, M, MEXU, MSC, NY, S, UC!, US).

Simsia guatemalensis H. Rob. & Brettell, Phytologia 24:372. 1972. — TYPE: Guatemala, Amatitlán, Amatitlán, 1200 m, Oct 1904, H. von Tuerckheim s.n. [8701] (US).

ILLUSTRATION: see synonymy.

Coarse annuals (persisting?), to 2(–4) m high, stems sparsely hispid to setose, at least distally, and glandular-puberulent; petioles 15–100 mm long, narrowly, if at all, winged, sometimes winged only at lower nodes, sometimes basally dilated into amplexicaul auricles 2–20+ mm in diam., leaf blades del-

tate to ovate, sometimes obscurely to deeply 3-lobed, 3–15 cm long, 2–12 cm wide, bases cuneate to cordate, margins coarsely crenate-dentate, apices acute to acuminate, abaxial faces glandular-puberulent and with scattered, short and erect to long and antrorse, nonglandular hairs, adaxial faces glandular-puberulent and coarsely hirtellous to hispid; heads 3–7+ in cymiform clusters, the clusters often further aggregated in paniculiform associations; peduncles mostly 1–8 cm long, hispid-setose and glandular-puberulent; involucre campanulate to hemispheric, 8–15+ mm high; phyllaries mostly 15–30(–60+), subequal, linear to lance-linear or lanceolate, scarious to herbaceous, pale to dark green, striate-nerved, pilose and glandular-puberulent; paleae stramineous to greenish, sometimes medially and distally blackish, (7–)9–11+ mm long, scarious with firmer apices, abruptly acuminate, medially hirtellous and minutely glandular-puberulent; ray florets 8–13(–40+), corollas pale yellow, tubes ca. 1 mm long, laminae ovate to oblong, 5–6(–10+) mm long; disc florets mostly 30–70(–150+), corollas pale yellow to ochroleucous, tubes ca. 1 mm long, throats ca. 3.5 mm long, basally hirtellous, lobes deltate, ca. 0.8 mm long, abaxially hispidulous; style branches ca. 2 mm long; cypselae blackish, sometimes mottled, obovate, 4–5+ mm long, glabrous or appressed-pubescent with antrorse hairs; pappi none or 2, scabrellous awns 2.5–4(–6+) mm long; $2n = 34$; flowering mostly Sep–Jan.

Roadsides and wooded slopes in Evergreen Seasonal, Tropical Deciduous, and Palm forests; uncommon to common in Northern Highlands, on Central Plateau, in Central depression, and in E Sierra Madre, rare on upper Pacific Coastal Plain; 550–1900 m. Mex. (Nay., Jal., Gto., Qro., Mich., Méx., Mlos., Pue., Gro., Oax., Chis.), Guat., Hond., Salv., Nic., C.R. CHIAPAS COLLECTIONS: *L* 251 (DS); *L* 2875 (DS); *Prat* 1084 (CAS, TEX); *Prat* 1096 (CAS, TEX); *S&S* 2178 (GH); *Spo* 2768 (TEX); *Spo* 2769 (UC); *Spo* 2792 (TEX); *T* 2033 (DS, F); *Vi* 1168 (TEX); *BV* 15-12 (DS); 6277; 8426; 9437; 23411; 30382; 41161; 41483; 46090; 46972; 48937; 53743; 55461; 56258.

Spooner (1990) recognized five varieties in *Simsia foetida* and referred all Chiapan collections to *S. foetida* var. *foetida*. I treat his vars. *foetida* and *grandiflora* as belonging to one, undivided, polymorphic species. Of Spooner's other vars., *jamaicensis* is restricted to Jamaica, *megacephala* to Oaxaca, and *panamensis* to Panama, Venezuela, and Bolivia; these three taxa may be distinct species and are excluded from my circumscription of *Simsia foetida*. *Simsia chaseae* (Millspl.) S. F. Blake, restricted to lowland Ver., Camp., Yuc., and Q. Roo, may be conspecific with *S. foetida*.

4. *Simsia ghiesbreghtii* (A. Gray) S. F. Blake, Proc. Amer. Acad. Arts 49:392. 1913.

— *Encelia ghiesbreghtii* A. Gray, Proc. Amer. Acad. Arts 8:658. 1873. — TYPE: Mexico, "Mountain forest near Chiapas," 1864–1870, A. B. Ghiesbreght s.n. [568] (GH!). *Verbesina argentea* Bertol., Novi Comment. Acad. Sci. Inst. Bononiensis 4:435. 1840, not *Verbesina argentea* Gaudich. 1829. — TYPE: Guatemala, Sacatepequez,

"Vulcano d'acqua," 1837, *Vallas*[quez] (or *Valasquez*) s.n. (BOLO).

Encelia sericea Hemsl. in F. Godman and O. Salvin, Biol. cent.-amer., Bot. 2:185. 1881. — *Simsia sericea* (Hemsl.) S. F. Blake, Proc. Amer. Acad. Arts 49:393. 1913. — TYPE: Guatemala, Montagua Valley, 1861, O. Salvin and F. Godman 133 (K; isotype: US).

ILLUSTRATION: none found.

Suffrutescent, to 1+ m high, stems retrorsely pilose-hispid and hirtellous; petioles 3–12+ mm long, sometimes with connate, basal amplexicaul auricles to 15 mm long, leaf blades broadly lanceolate to lance-ovate or narrowly deltate, 3–12+ cm long, 14–60+ mm wide, bases cuneate to truncate or subcordate, margins remotely toothed, apices acute to attenuate, abaxial faces sericeous to densely pilose with fine, erect to arched hairs ca. 1.5 mm long, adaxial faces closely scabrellosus to hirsutulous; heads borne singly or 3–8 in loose, corymbiform clusters; peduncles mostly 1–6 cm long; involucre campanulate to cylindric or hemispheric, 10–12 mm high; phyllaries ca. 21, linear to lanceolate or lance-ovate, unequal, the outer shorter, narrower, all sparsely shaggy-hirsute or pilose-hispid, distally minutely granular-glandular; paleae stramineous, ca. 9 mm long, stiffly herbaceous to scarious, distally indurate-pungent, medially sparsely hispidulous and minutely glandular-puberulent; ray florets 7–10+, corollas yellow to greenish, tubes 1–1.5 mm long, laminae oblong, 10–12+ mm long; disc florets 25–50, corollas yellow, tubes ca. 1 mm long with scattered glandular hairs, throats abruptly dilated, cylindric, 4–4.5 mm long, minutely hirtellous, more so proximally, lobes lance-triangular, ca. 1 mm long, abaxially hispidulous; style branches 1.5–2 mm long; cypselae black/buff mottled, narrowly obovate to oblong in outline, flattened to biconvex, 2.5–4 mm long, glabrous or pubescent; pappi none or of 2 awns 1–3 mm long plus 0–12 squamellae 0.2–0.7 mm long; $2n = 34$; flowering Apr.

Openings on wooded slopes in Pine-Oak Forest; rare on Central Plateau; ca. 1800 m. Southern Mex. (Chis.), Guat. CHIAPAS COLLECTIONS: 9507; 48485.

5. *Simsia sanguinea* A. Gray, Smithsonian Contr. Knowl. 3(5):107 (Pl. Wright.) 1852.

— *Encelia sanguinea* (A. Gray) Hemsl. in F. Godman and O. Salvin, Biol. cent.-amer., Bot. 2:185. 1881. — *Simsia erythanthema* Schultz-Bip. ex A. Gray, Proc. Amer. Acad. Arts 19:9. 1883, pro syn. — LECTOTYPE: (Blake 1913: 395): Mexico, probably Chiapas, "mountains," A. B. Ghiesbreght s.n. [305] (GH).

Encelia sanguinea (A. Gray) Hemsl. var. *palmeri* A. Gray, Proc. Amer. Acad. Arts 22:247. 1887. — *Simsia sanguinea* A. Gray var. *palmeri* (A. Gray) S. F. Blake, Proc. Amer. Acad. Arts 49:395. 1913. — TYPE: Mexico, Jalisco, Rio Blanco, Sep 1886, E. Palmer 602 (GH; isotypes: BM, G, K, LE, MEXU, MO, NY, US).

Helianthus hastatus Sessé & Moc., Pl. nov. Hisp. 147. 1890. — TYPE: Mexico, Guerrero, "Chilapac," Sep, M. Sessé et al. 2947 (MA, isotype: F).

Simsia triloba S. F. Blake, Proc. Amer. Acad. Arts 49:393. 1913. — TYPE: Mexico, Puebla, Cerro de Paxtle, near San Luis Tultitlanapa, Sep 1908, C. A. Purpus 3022 (GH; isotypes: BM, F, MO, NY, UC!, US).

Simsia sanguinea A. Gray f. *albida* S. F. Blake ex Loesn., Verh. Bot. Vereins Brandenburg 65:120. 1923, nom. nud. — *Simsia sanguinea* A. Gray subsp. *albida* S. F. Blake, Contr. U.S. Natl. Herb. 22:630. 1924. — TYPE: Guatemala, Huehuetenango, Quen Santo, Uaxac canal, 1300 m, 21 Jul 1896, C. Seler and E. Seler 3098 (GH; isotype: MO). *Aspilia grosseserrata* M. E. Jones, Contr. W. Bot. 18:84. 1933. — TYPE: Mexico, Jalisco, La Barranca, Guadalajara, 17 Nov 1930, M. E. Jones 27778 (POM; isotypes: CAS, MO, NY, UC!).

Cosmos hintonii Sherff, Brittonia 16:72. 1964. — TYPE: Mexico, Guerrero, Mina, Jiotes, 500 m, 11 Sep 1937, G. B. Hinton et al. 10647 (MICH; isotypes: G, GH, K, LL, UC!, US).

ILLUSTRATION: none found.

Perennials, mostly herbaceous, sometimes suffrutescent, to 1(–2) m high; leaves sessile or with winged petioles, the petioles sometimes dilated at base, leaf blades lance-linear to narrowly deltate, sometimes with two lateral, antrorse lobes at base, mostly 3–12 cm long, 1–3 cm wide, margins subentire to remotely callous-toothed, apices acute, abaxial faces scabrellosus to hirtellous with minute, conical hairs and fine, longer, antrorse hairs, adaxial faces similar or with minute hairs more erect; heads loosely associated in cymiform or corymbiform aggregations of 3–8(–12+); peduncles 1–7+ cm long, glandular-puberulent and, sometimes, hispid; involucre cylindric-campanulate, mostly 7–9+ mm high; phyllaries ca. 21, green to purple or blackish, lance-linear to lanceolate or lance-ovate, minutely glandular-puberulent, often hispid or pilose as well; paleae stramineous to purple, 7–8+ mm long, scarious, attenuate, medially pilose; ray florets typically 8–12(–15), corollas purple to reddish, pink, or white [yellow], tubes 1.5–2 mm long, laminae ovate to oblong, 8–12 mm long; disc florets 15–40+, corollas concolorous with rays, tubes 1–1.5 mm long, throats 4–4.5 mm long, lobes narrowly triangular, 1–1.5 mm long, abaxially papillate; style branches ca. 3 mm long; cypselae blackish, obovate, 4–5+ mm long, subsericeous; pappi of 0–2, fragile, puberulent awns 2–3 mm long; $2n = 34$; flowering Aug–Nov.

Open, often rocky, places in Lower Montane Rain and Pine-Oak forests and in Savannas; uncommon in S Northern Highlands, on Central Plateau, in Central Depression, and in Sierra Madre; 700–2500 m. Mex. (Jal., Mich., Mex., Mlos., Pue., Ver., Gro., Oax., Chis.), Guat., Salv. CHIAPAS COLLECTIONS: Crq 10461 (DS, TEX); L 2959 (DS, F); P 9120 (UC); P 9122 (UC); Spo 2772 (UC); T 2060 (DS, F); 27423; 28465; 39898; 41302; 46026; 46072; 46143; 46316; 46621; 49030; 54889; 70449.

6. *Simsia villasenorii* D. Spooner, Syst. Bot. Monogr. 30:41. 1990.

— TYPE: Mexico, Chiapas, 12 km S of route 190, near Rizo de Oro [Nueva Tenochtitlan], 1000 m, 16 Oct 1971, D. E. Breedlove 20576 (DS!; isotypes: ENCB, LL, MEXU, MICH, MO, NY).

ILLUSTRATION: Syst. Bot. Monogr. 30:43. 1990.

Perennial herbs, to ca. 1 m high, stems hirtellous with patent to retrorse hairs; petioles 2–12+ mm long, not winged but basally joined by connate auricles 2–4 mm long, leaf blades

deltate to ovate, 5–8 cm long, 2–6 cm wide, bases truncate to broadly cordate, margins unevenly crenate-dentate, apices acute, abaxial faces hirtellous, adaxial faces scabrellous or hirtellous; heads 3–7+ in cymiform clusters at ends of main and upper axillary stems; peduncles 3–20 mm long; involucre campanulate to cylindric or obconic, 11–14 mm high; phyllaries ca. 21, unequal, green to purple, herbaceous to cartilaginous, lanceolate to lanceolate, stiffly acute, the outer shorter, broader, all striately nerved and minutely scabrellous, some ciliate; paleae stramineous to purple, 10–13 mm long, scarious with stiff, cartilaginous apices, mucronate, medially pilosulous distally; ray florets 8–10, corollas pale yellow, tubes ca. 2.5 mm long,

laminae narrowly oblong, 9–10 mm long; disc florets 25–40, corollas pale yellow, distally purplish, tubes ca. 1 mm long, throats ca. 5.5 mm long, basally hirtellous, lobes narrowly deltate, ca. 1.5 mm long, abaxially hirtellous; style branches ca. 3.5 mm long; cypselae blackish, obovate, 5–5.5 mm long, subsericeous; pappi of 2, coarse, scabrellous awns to ca. 6 mm long; $2n = 34$; flowering Sep–Dec.

Rock outcrops and openings in Evergreen Seasonal, Tropical Deciduous, and Pine-Oak forests; rare or uncommon in Central Depression and in W Sierra Madre; 870–1000 m. Southern Mex. (Oax., Chis.). CHIAPAS COLLECTIONS: 20576; 44455; 52914; 56333; 60160; 70898.

65. SMALLANTHUS

Smallanthus Mackenzie in J. K. Small, Man. s.e. fl. 1406. 1933. — TYPE: *Smallanthus uvedalia* (L.) Mackenzie = *Osteospermum uvedalia* L.

Mostly perennial herbs, shrubs, or small trees, to 12 m high, rarely annuals; leaves opposite, petiolate or sessile, petioles often winged, blades various, often broadly deltate to pentagonal and palmately lobed, sometimes pinnately lobed, or lance-elliptic and not lobed, all forms usually with callous-toothed margins, pubescence various, abaxial faces usually minutely resinous-gland-dotted; heads pedunculate, borne singly or loosely aggregated in panicleform or corymbiform clusters; involucre markedly biseriate, mostly 1–3 cm across; outer phyllaries 4–6, herbaceous-coriaceous, rotund to lanceolate, inner phyllaries 8–20+, much narrower and more scarious, in fruit strongly navicular, infolding ray cypselae; receptacles flat to convex or everted; paleae mostly scarious, narrowly oblanceolate to spatulate, somewhat to strongly navicular, persistent or deciduous; ray florets 8–20(–40) in 1(–2) series, pistillate, fertile, corollas white to bright yellow or orange, often fading or drying to white or magenta, tubes stout, densely pilose with pointed hairs, laminae narrowly cuneate to linear, elliptic, or ovate; disc florets 20–80(–150+), functionally staminate, corollas pale yellow to orange, sometimes purplish distally, tubes much shorter than to about equalling the abruptly campanulate to urceolate or narrowly funnelform throats, lobes 5, unequal to subequal, shortly triangular to lance-deltate; styles minutely to deeply bifid, minutely to shaggily hispidulous distally, astigmatic; cypselae purplish brown to black, commonly compressed, asymmetrically obovate to rounded-quadrangular in outline, obliquely inserted on receptacles, glabrous, noticeably striate but not with 2–3 well-defined ribs, \pm fleshy-drupaceous when fresh; pappi none; $2n = 16(?)$.

About 20 species, all American, ranging mostly through southern Mexico and Central America to temperate South America, one species in eastern and southeastern United States. Very closely related to *Rumfordia*; included in *Polymnia* L. by Wells (1965).

REFERENCES: ROBINSON, H. 1978. Studies in the Heliantheae (Asteraceae). XII. Re-establishment of the genus *Smallanthus*. *Phytologia* 39:47–53; TURNER, B. L. 1988. A new species of, and observations on, the genus *Smallanthus* (Asteraceae—Heliantheae). *Phytologia* 64:405–409; WELLS, J. R. 1965. A taxonomic study of *Polymnia* (Compositae). *Brittonia* 17:144–159.

- a. Larger leaf blades elliptic to lanceolate, mostly pinnately lobed; outer phyllaries 5–9 mm long; ray corollas yellow to orange, often drying magenta; throats of disc corollas very narrowly funnelform; cypselae mostly less than 3.5 mm long. 2. *S. oaxacanus*
- aa. Larger leaf blades pentagonal to deltate, mostly palmately lobed; outer phyllaries (7–)9–16 mm long; ray corollas bright to pale yellow, fading to whitish; throats of disc corollas abruptly dilated; cypselae more than 3.5 mm long.
 - b. Leaves resinous-gland-dotted on abaxial faces; inner phyllary apices acuminate but not long-attenuate; disc corollas yellow to orange distally 1. *S. maculatus*
 - bb. Leaves not resinous-gland-dotted on abaxial faces; inner phyllary apices attenuate, 5–12 mm long, stipitate-glandular; disc corollas often purplish distally 3. *S. riparius*

1. *Smallanthus maculatus* (Cav.) H. Rob., *Phytologia* 39:50. 1978.

— *Polymnia maculata* Cav., Icon. 3:14, t. 227. 1794 [1795]. — TYPE: Grown in Madrid from Mexican seed; no specimen seen; use of this name here is based on the illustration.

Polymnia maculata Cav. var. *adenotricha* S. F. Blake, Contr. Gray Herb. 52:34. 1917. — TYPE: Guatemala, Santa Rosa, 1525 m., Aug 1892, E. T. Heyde and E. Lux 3807 (GH).

Polymnia maculata Cav. var. *hypomalaca* S. F. Blake, Contr. Gray Herb. 52:33. 1917. — TYPE: Mexico, "barranca

above Santa Fe [Fé], 2590 m, 1 Sep 1905, C. G. Pringle 13564 (GH).

Polymnia maculata Cav. var. *vulgaris* S. F. Blake, Contr. Gray Herb. 52:33. 1917, nom. superfl., illegit., circumscription included type of *Polymnia maculata*.

Polymnia maculata Cav. var. *glabricalis* S. F. Blake, J. Wash. Acad. Sci. 25:313. 1935. — TYPE: Mexico, Tamaulipas, near Sab José, Cerro Carrizo, 19 Jul 1930, H. H. Bartlett 10508 (US).

Smallanthus obscurus B. L. Turner, Phytologia 64:406. 1988. — TYPE: Mexico, Chiapas (reported as Oaxaca), road to Chanal, 16–20 km E of Chilil, 2380 m, 10 Nov 1976, D. E. Breedlove 41387 (reported as 42387) (TEX; isotype: CAS!).

ILLUSTRATION: Fig. 49.

Coarse, annual herbs or perennial suffrutices, 1–3(–5) m high; leaves variable, petioles broadly to narrowly winged, 2–9(0–15) cm long, entire or toothed, often auriculate and clasping at their bases, distal leaves sometimes sessile, blades of mid-stem leaves raggedly deltate to pentagonal, coarsely and irregularly palmately to subpinnately lobed, 8–25(–45) cm long, often as wide, distal leaves smaller, more ovate to lanceolate, margins of all commonly callous-toothed, abaxial faces minutely resinous-gland-dotted and pilose, villous, velutinous, or subcanescent, adaxial faces subglabrous to variously strigose to scabrelous; heads borne singly or, more commonly, loosely aggregated in corymbiform or paniculiform clusters of 3–8+; peduncles 2–9 cm long, subglabrous to densely pilose and/or stipitate-glandular; outer phyllaries orbicular to ovate or broadly lance-attenuate, (7–)9–16 mm long, subglabrous but for margins and veins to evenly strigose and/or stipitate-glandular, sometimes minutely toothed on distal margins, inner phyllaries as many as rays, navicular, infolding ovaries of ray florets, acuminate, usually strigose and stipitate-glandular; receptacles everted-convex; paleae scarious, oblanceolate, attenuate, somewhat navicular, erose distally; ray florets 11–15(–20+), corollas pale to bright yellow, tubes ca. 1 mm long, densely pilose, laminae (7–)11–25 mm long; disc florets 60–150, corollas yellow to orange, at least distally, mostly 5–7 mm long, tubes 1.1–1.8 mm long, glabrous or pubescent, throats abruptly, sometimes obliquely, dilated, urceolate to campanulate, mostly glabrous, 3.5–4.6 mm long, lobes deltate to lance-deltate, unequal, 0.5–1.2 mm long, bearing pointed, eglandular hairs and blunt, glandular hairs; styles bifid ca. 0.5 mm, distal 2 mm hispidulous-papillate; cypselae 3.5–5.5 mm long; pappi none; $2n = 32, 34$.

Wooded slopes, ravines, streambanks, etc., sometimes ruderal, in Lower Montane Rain, Montane Rain, Evergreen Cloud, Seasonal Evergreen, Pine-Oak-Liquidambar, and Pine-Oak forests; very common on Central Plateau, less common to uncommon in Northern Highlands, Eastern Highlands, Central Depression, and Sierra Madre; (300–)800–2900 m. Mex. (Coah., N.L., Tam., Zac., S.L.P., Nay., Jal., Gto., Hgo., Mich., Ver., Gro., Oax., Chis.), Guat., Bel., Hond., Salv., Nic., C.R., Pan. CHIAPAS COLLECTIONS: *A* 1299 (DS); *Calz* 3352 (TEX); *Calz* 3526 (TEX); *Calz* 3682 (TEX); *Cro* 47215 (MO, UC); *Cro* 66163 (UC); *Crq* 10473 (DS); *Crq* 10874 (DS, TEX); *F* 3363 (DS, TEX); *GL* 482 (TEX); *GS* 148 (TEX); *GG* 129 (TEX); *GG* 372 (TEX); *GG* 580 (TEX); *H&F* 4177 (TEX); *L* 1099 (DS); *L* 1419 (DS); *L* 1731 (DS); *L* 1794 (DS); *L* 1938 (DS); *L* 2206 (DS); *L* 2330 (DS); *L* 2387 (DS); *Lo* 453 (CAS);

Lo 547 (CAS, TEX); *Ma* CH11 (TEX); *M-I* 223 (CAS); *Pa* 688 (CAS); *PG* 11 (CAS, TEX); *PG* 59 (TEX); *PG* 289 (CAS, TEX); *SC* 77 (CAS, TEX); *SC* 241 (TEX); *SC* 359 (TEX); *SC* 676 (TEX); *SR* 113 (TEX); *SR* 995 (TEX); *SI* 2393 (TEX); *SI* 2959 (TEX); *Sund* 2364 (TEX); *T&L* 41028 (DS); *T* 16 (DS); *T* 1072 (DS); *T* 1182 (DS); *T* 1232 (DS); *T* 2760 (DS); *T* 3073 (DS); *T* 4347 (CAS); *T* 4468 (CAS); *T* 4595 (CAS); *T* 9331 (TEX); *Urb* 3341 (TEX); *Vi* 865 (TEX); *We* 17910 (DS, UC); *Z* 257 (DS); *Z* 259 (TEX); 6168; 6839; 7483; 10748; 10993; 12188; 12416; 12585; 12654; 13091; 13626; 14427; 14658; 14725; 23849; 29299; 35060; 37292; 37339; 39557; 39659; 39792; 39991; 41298; 41387; 41859; 45991; 46036; 46163; 46340; 46341; 46353; 46358; 46370; 46801; 46935; 47061; 51729; 51772; 51783; 51940; 52008; 52464; 52950; 52953; 53242; 68721; 69902.

Divers morphological modes are encompassed within the circumscription adopted here; careful study may show that three, or more, species are included. In Chiapas, most of these plants have winged petioles, shallowly lobed leaf blades that are scabrelous adaxially and pilose abaxially, and outer phyllaries with pointed, eglandular hairs. A distinctive subset has subcoriaceous, deeply lobed leaves and outer phyllaries with both pointed, eglandular and blunt, stipitate-glandular hairs; such plants have been confused with *S. oaxacanus*. Other plants (e.g., *D. E. Breedlove* 23849, 35060, 39991; *Cronquist* 10874; *Ton* 3073), from scattered localities at relatively low elevations (300–950 m), are distinctive in having wingless or very narrowly cuneate-winged petioles and glabrous or nearly glabrous leaves and outer phyllaries.

Along with segregating his *S. obscurus*, B. L. Turner (1988) treated the type of *S. maculatus* as conspecific with that of *S. uvedalia*.

2. *Smallanthus oaxacanus* (Schultz-Bip. ex Klatt) H. Rob., Phytologia 39: 51. 1978.

— *Polymnia oaxacana* Schultz-Bip. ex Klatt, Leopoldina 23:89. 1887. — TYPE: Mexico, “Trapiche de la Concepcion,” F. M. Liebmam “387” (C; isotypes: F, US.)

Polymnia nelsonii Greenm., Proc. Amer. Acad. Arts 39:99. 1903. — TYPE: Mexico, Chiapas, near San Cristóbal de Las Casas, 2150–2450 m, 18 Sep 1895, E. W. Nelson 3221a (Syntypes: GH, US).

ILLUSTRATION: none found.

Herbs or suffrutices, to 2+ m high; petioles winged, often toothed, often auriculate at base, 2–11 cm long, ca. 1 cm wide, leaf blades mostly 10–15+ cm long, pinnately divided nearly to midrib into mostly 5–7 irregular, toothed lobes, faces pilose to scabrelous, distal leaves smaller, less divided, sometimes sessile; heads borne singly or 3–5(–9) loosely associated; peduncles 3–10 cm long, pilose and stipitate-glandular; outer phyllaries 5, ovate to lance-ovate, mostly 5–9 mm long, basally connate, sparsely pilose, sometimes minutely stipitate-glandular and/or strigillose, inner phyllaries as many as rays, lance-attenuate, ca. 5 mm long; paleae scarious, slender, navicular, infolding disc florets, the outermost sometimes purplish; ray florets 10–15, corollas yellow to orange, often drying to purple or magenta, tubes ca. 1 mm long, densely pilose, laminae

Species 4–5; one widespread in tropical America and less common in Old World, a second known only from Antilles, a third known only from tropical Old World, and 1–2 in South America.

REFERENCES: STROTHER, J. L. 1991. Taxonomy of *Complaya*, *Elaphandra*, *Logeton*, *Jefea*, *Wamalchitamia*, *Wedelia*, *Zexmenia*, and *Zyzyxia* (Compositae-Heliantheae-Ecliptinae). Syst. Bot. Monogr. 33: 1–111; PRUSKI, J. F. 1996. Compositae of the Guayana Highland-XI. *Tuberculocarpus* gen. nov. and some other Ecliptinae (Heliantheae). Novon 6:404–418.

1. *Sphagneticola trilobata* (L.) Pruski, Mem. New York Bot. Gard. 78:114. 1996.

— *Silphium trilobatum* L., Syst. nat., ed. 10. 2:1233. 1759.
— *Wedelia carnosa* Rich. in C. H. Persoon, Syn pl. 2:490. 1807. — *Seruneum trilobatum* (L.) Kuntze, Revis. gen. pl. 1:365. 1891. — *Wedelia trilobata* (L.) A. Hitchc., Ann. Rep. Missouri Bot. Gard. 4:99. 1893. — *Stemmodontia trilobata* (L.) Small, Fl. s.e. U.S. 1262, 1340. 1903. — *Complaya trilobata* (L.) Strother, Syst. Bot. Monogr. 33:14. 1991. — *Thelechiunia trilobata* (L.) H. Rob. & Cuatrec., Phytologia 72:142. 1992. — LECTOTYPE (Howard 1989, Fl. Lesser Antilles): Plate 107, fig. 2, in Plumier, Pl. Amer. 1755.

Sphagneticola ulei O. Hoffm., Notizbl. Königl. Bot. Gart. Berlin 22: 36. 1900. — TYPE: Brazil, Rio de Janeiro, "Sümpfen der Restinga der Gavea," Sep 1899, *Ule* 3914 — HOLOTYPE: B (destroyed); LECTOTYPE: (Pruski, Novon 6:412. 1996): HBG; isotype: HBG.

For additional synonymy (names based on types from Antilles and South America), cf. Schulz in Urban, Symb. Antill. 7:95–97. 1911.

ILLUSTRATION: Fig. 50.

Prostrate or sprawling perennials, often somewhat succulent, stems to 2+ m long, often rooting at proximal nodes; leaves sessile or with cuneate-winged petioles continuous with the blades, petiole bases usually connate-perfoliate, leaf blades narrowly oblanceolate to obovate or rhombic, usually some or all with 2 short, lateral, patent to antrorse, acute to obtuse lobes,

overall 5–12(–18) cm long, 1–5+ cm wide (including lobes), bases narrowly to broadly cuneate or cuneate and then abruptly rounded, margins subentire to coarsely and remotely toothed, apices obtuse to acute, abaxial faces subglabrous to sparsely strigose or appressed-pubescent with hairs to 0.5–1.5 mm long and, usually, conspicuously dotted with subsessile glands or resinous globules, adaxial faces more coarsely hairy and little, if at all, gland-dotted; peduncles 5–10(–18) cm long; involucre obconic, 8–12(–15) mm high, becoming hemispheric in fruit; phyllaries 12–15; paleae stramineous to yellowish, 5–9 mm long; ray florets 4–10, corollas orange to yellow, tubes 1–2 mm long, laminae oblong to obovate, 6–15 mm long, usually strongly gland-dotted abaxially; disc florets 30–60+, corollas orange to yellow, tubes 0.8–1.5 mm long, throats ampliate, funnellform to campanulate, 1.8–3.2 mm long, lobes deltate, 0.8–1 mm long, pilose-papillate on adaxial margins with hairs 0.2–0.5 mm long; style branches attenuate, distally hispidulous; cypselae 3–5 mm long; rostra stout, 0.3–0.8 mm high; pappi 0.1–0.6 mm high (each rostrum and pappus often ultimately obscured by corky collar 1–1.5 mm high and continuous with the cypselae body); $2n = 60$.

Beaches, streambanks, and other wet places, often ruderal along roads and in plantations; uncommon (or seldom collected) on Gulf Coastal Plain and lower reaches of Northern Highlands; mostly below 500 m, rarely to 900 m. Southern U.S. (Calif., Fla., La.), southeastern Mex. (Ver., Tab., Camp., Q. Roo, Chis.), Guat., Bel., Hond., Nic., C.R., Pan.; Antilles; S. Amer. (Col., Guy., Sur., Fr. Gui., Ven., Braz.); adventive in Old World tropics. CHIAPAS COLLECTIONS: C. L. Gilly 200 (MICH); Mz 9048 (TEX, UC); 46888; 46941; 47235; 55255.

67. SQUAMOPAPPUS

Squamopappus R. K. Jansen, N. A. Harriman, & Urbatsch, Syst. Bot. 7:480. 1982. — TYPE: *Squamopappus skutchii* (S. F. Blake) R. K. Jansen, N. A. Harriman, & Urbatsch \equiv *Calea skutchii* S. F. Blake.

Shrubs or trees, to 10 m high; leaves opposite, petiolate, blades mostly lanceolate, triplinerved distal to their bases, margins subentire to serrate; heads 30–90 in terminal and axillary corymbiform or paniculiform clusters; peduncles slender, sometimes bracteolate, pilose; involucre turbinate-campanulate, 5–8 mm high; phyllaries 16–20 in ± 3 series, imbricate, the outer shorter; receptacles slightly convex; paleae shorter than florets, weakly navicular, distally scarios; ray florets 8–13, fertile, corollas yellow, tubes glabrous, laminae ovate, glabrous, not gland-dotted; disc florets 15–30, bisexual, fertile, corollas yellow, sometimes reddish distally, glabrous, tubes shorter than the ampliate, cylindric throats, lobes 5, deltate, recurved; style branches slender, stigmatic almost to their rounded tips; cypselae brownish, somewhat trigonous or flattened, narrowly cuneate-stipitate, ciliolate, distally pilosulous on their faces; pappi lacerate coronas of free or connate squamellae, somewhat awned over each angle; $x = 19$.

Monotypic.

REFERENCE: JANSEN, R. K., N. A. HARRIMAN, and L. E. URBATSCH. 1982. *Squamopappus* gen. nov. and redefinition of *Podachaenium* (Compositae: Heliantheae). Syst. Bot. 7:476–483. 1982.

**1. *Squamopappus skutchii* (S. F. Blake)
R. K. Jansen, N. A. Harriman, & Urbatsch,
Syst. Bot. 7:481. 1982.**

— *Calea skutchii* S. F. Blake, J. Wash. Acad. Sci. 24:438. 1934. — *Podachaenium skutchii* (S. F. Blake) H. Rob., Phytologia 38:413. 1978. — TYPE: Guatemala, Chi-

matenango, above 2745 m, 4 Dec 1933, *A. F. Skutch* 729 (US).

ILLUSTRATION: **Fig. 51.**

Shrubs or trees, to 5(–10) m tall; stems shaggy-pilousulous with sordid hairs; petioles 5–10+ mm long, pilose, leaf blades lanceolate to ovate, mostly 6–15 cm long, 2–3(–7) cm wide, bases cuneate, margins entire or serrate, apices acute to attenuate, abaxial faces resin-gland-dotted and sparsely to densely pilousulous, adaxial faces minutely scabrelous; heads in convex, paniculiform clusters 8–20 cm across; peduncles 1–15+ mm long; phyllaries pale with darker nerves, mostly lance-ovate to oblong, pilousulous and ciliolate; paleae stramineous, somewhat

darker distally, 3–5 mm long, similar to phyllaries; ray corollas somewhat fleshy, tubes ca. 1.5 mm long, laminae ca. 4 mm long; disc corolla tubes ca. 1.5 mm long, throats ca. 2.5 mm long, lobes ca. 0.5 mm long; style branches ca. 1.2 mm long; cypselae ca. 3 mm long; pappi ca. 0.5–1.5 mm long; $2n = 38$.

In Evergreen Cloud and Pine-Oak-*Liquidambar* forests; uncommon on Central Plateau and in SE Sierra Madre; 2100–2700 m. Southern Mex. (Chis.), Guat. CHIAPAS COLLECTIONS: *Cb* 3812 (TEX); *Mz* 20515 (LL); *EM* 4627 (LL); *EM* 5454 (CAS, LL); *SR* 434 (CAS, TEX); *SR* 523 (CAS, TEX); *SI* 3105 (TEX); *T* 554 (DS); 42771; 48848; 53372; 66061.

68. SYNEDRELLA

Synedrella Gaertn., *Fruct. sem. pl.* 2:456. 1791, nom. cons. — TYPE: *Synedrella nodiflora* (L.) Gaertn. \equiv *Verbesina nodiflora* L.

Ucacou Adans., *Fam.* 2:615. 1763. — LECTOTYPE: (Hitchcock 1893): *Ucacou nodiflora* (L.) A. Hitchc. \equiv *Verbesina nodiflora* L. \equiv *Synedrella nodiflora* (L.) Gaertn.

Usually erect, sometimes procumbent, annuals, rarely persisting, to 3(–8+) dm high; leaves opposite, petiolate, blades broadly ovate to lanceolate, triplinerved from near their bases, margins serrate to subentire; heads terminal and axillary, sessile or nearly so, glomerate-fascicled or borne singly; involucre narrowly campanulate to cylindric, mostly 6–10 mm high; phyllaries 2–5, green-herbaceous to stramineous-chartaceous, intergrading with paleae; receptacles very small, convex; paleae mostly peripheral; ray florets 3–8(–12), obscurely biseriate, fertile, corollas yellow; disc florets 7–15(+?), bisexual, fertile, corollas ochroleucous proximally, yellow distally, very slender, tubes about equalling the barely amplate throats, lobes 4(–5), very short, deltate; style branches very slender, minutely hispidulous distally; anthers 4(–5); cypselae dimorphic, all dark brown to blackish with paler margins, radially flattened, oval (ray) to narrowly cuneate (disc) in outline, laciniate- to pectinate-winged (ray) or wingless (disc); pappi of 2(–3+), stout, erect awns; $x = 20$ (19?, 18?).

Monotypic; closely related to *Calypocarpus*.

REFERENCE: HITCHCOCK, A. S. 1893. List of plants collected in the Bahamas, Jamaica and Grand Cayman. *Annual Rep. Missouri Bot. Gard.* 4:47–179.

1. *Synedrella nodiflora* (L.) Gaertn., *Fruct. sem. pl.* 2:456, t. 171. fig. 7. 1791.

— *Verbesina nodiflora* L., *Cent. pl.* 1:28. 1755. — *Ucacou nodiflora* (L.) A. Hitchc., *Annual Rep. Missouri Bot. Gard.* 4:100. 1893. — TYPE: unknown; use adopted here is consistent with established usage.

ILLUSTRATION: **Fig. 52.**

Mostly erect annuals, to 3–4(–15) dm high; petioles 5–35 mm long, often ciliolate, leaf blades mostly 3–10 cm long, 2–5 cm wide, apices usually acuminate, faces strigose with mostly short, and some longer, hairs; phyllaries oblanceolate to oblong-linear, mostly strigose and minutely ciliolate; paleae herbaceous to scarious, lance-linear to linear, obtuse to blunt, erose-ciliolate on distal margins, otherwise glabrous; ray corolla tubes very slender, glabrous, ca. 2 mm long, laminae very narrowly ovate

to linear, 2(–4) mm long; disc corollas glabrous but for lobes, ca. 3 mm long, tubes ca. 1.3 mm long, throats ca. 1.3 mm long, lobes ca. 0.3 mm long, minutely papillate within, sparsely hispidulous without; ray cypselae ca. 4 mm long, 1.2 mm wide excluding wings, smooth on faces, disc cypselae ca. 4 mm long, 0.7 mm wide, often tuberculate; pappus awns erect or divergent, 1–2 mm long and flattened (ray) or 2–4 mm long and terete (disc); $2n = 36, 38, 40$.

Ruderal in Seasonal Evergreen, Tropical Deciduous, and Pine-Oak forests; infrequent in Central Depression, in Sierra Madre, and on Pacific Coastal Plain, to be expected throughout at lower elevations; 180–900(–1400) m. Evidently native to New World, now virtually pantropical. Mex. (Cma., Mich., Ver., Yuc., Chis.), Guat., Salv., Hond., Nic., C.R., Pan.; Antill.; S.A.; Old World. CHIAPAS COLLECTIONS: *Cro* 47503 (MO, UC); *He* 1085 (CAS, TEX); *Ve* 2132 (UC); 30723; 37351; 38650; 46101; 47508.

69. TAGETES

Tagetes L., *Sp. pl.* 887. 1753. — LECTOTYPE: (P. A. Rydberg in N. L. Britton et al., *N. Amer. fl.* 34:149. 1915; fide ING):

Tagetes patula L. = *Tagetes erecta* L.

Diglossus Cass., *Bull. Sci. Soc. Philom. Paris* 1817:70. 1817. — TYPE: *Diglossus variabilis* Cass. = *Tagetes filifolia* Lag.

Enalcida Cass., *Bull. Sci. Soc. Philom. Paris* 1819:31. 1819. — TYPE: *Enalcida pilifera* Cass. = *Tagetes coronopifolia* Willd. (fide Rydberg 1915).

Solenotheca Nutt., Trans. Amer. Philos. Soc., ser. 2, 7:371. 1841. — TYPE: *Solenotheca tenella* Nutt. = *Tagetes filifolia* Lag.

Strong-scented, annuals, perennial herbs, and shrubs, to 2 m high; leaves all opposite or the distal alternate, simple, pinnatifid, or pinnate, margins of blades or lobes entire or serrate, faces glabrous or pilosulous, usually bearing oil-filled, pellucid glands submarginally and/or scattered in the laminae; heads borne singly or aggregated in corymbiform clusters; peduncles often clavate, often fistulose; involucre narrowly cylindric to turbinate or broadly campanulate, mostly 6–20 mm high; phyllaries 3–21+, uniseriate or obscurely biseriate, connate almost to the tips, usually streaked or dotted with pellucid glands; receptacles convex to conic; paleae none; ray florets (0–)3–21+ (–100+ in some cultivars), pistillate (rarely neuter), corollas mostly yellow to orange, sometimes reddish brown or white or marked with reddish brown; disc florets 10–120+ (none in some cultivars), bisexual, corollas greenish yellow to yellow or orange, sometimes tipped with reddish brown or purple, usually very slender, tubes much longer than to about equal to throats, throats narrowly to openly funnelform, lobes 5, equal or one longer than the rest, shortly deltate to lance-linear; style-branch appendages abruptly penicillate to attenuate; cypselae usually blackish, very slender, 4–5-angulate, somewhat flattened, or fusiform-terete, finely striate, glabrous or hairy; pappi rarely none, typically of dissimilar, free or variously connate scales: 0–5 stoutly subulate to setose plus 0–5+ oblong to linear-oblong or lanceolate, erose-truncate or lacinate; $x = 12$.

Neotropical; ca. 50 spp. in xeric to wet habitats from southwestern United States through Mexico and Central America to South America (Chile and Arg.). Some species are widely cultivated; they and others have become naturalized far beyond their natural ranges.

REFERENCES: NEHER, R. T. 1966. Monograph of the genus *Tagetes* (Compositae). Thesis, Indiana Univ.; RYDBERG, P. A. 1915. *Tagetes*. In N. L. Britton et al., N. Amer. fl. 34:148–159; SOULE, J. A. 1993. Systematics of *Tagetes* (Tageteae: Compositae). Thesis, Univ. Texas, Austin.

- a. Leaves spatulate to oblong or linear, not divided, glands in laminae 4–16/mm² 5. *T. lucida*
- aa. Leaves mostly pinnate or pinnatifid, rarely not divided, glands in laminae 0–4/mm² or glands marginal or submarginal.
 - b. Leaf blades/lobes 0.5–1.5 mm wide, entire; ray corollas white 3. *T. filifolia*
 - bb. Leaf lobes (1–)3–12+ mm wide, serrate (if narrower, finely aristate at tip); ray corollas greenish yellow, yellow, orange, red, or brown.
 - c. Disc florets 0–10+, corollas pubescent to pilosulous on tubes and throats; cypselae subterete to fusiform, evenly appressed-pubescent to sericeous.
 - d. Leaves 3–7+ cm long with 15–25+ lobes 6–18 mm long; involucre 12–17 mm high, 3–5 mm diam. 4. *T. foetidissima*
 - dd. Leaves 5–10+ cm long with 7–13 lobes 15–45 mm long; involucre 7–10 mm high, 2–5 mm diam. 10. *T. terniflora*
 - cc. Disc florets 10–120+, corollas glabrous or puberulent on tubes and throats; cypselae mostly flattened or 4–5-angled, hirtellous on angles (rarely on faces as well) or glabrous.
 - e. Shrubs or suffrutescent; leaves often puberulent to pilosulous with crisped hairs; heads in congested, corymbiform clusters; peduncles 2–15 mm long; disc corollas ca. 5.5–6.5 mm long, lobes uniformly greenish yellow, minutely papillate adaxially 7. *T. nelsonii*
 - ee. Annuals; leaves glabrous or nearly so; heads borne singly or loosely associated; peduncles (1–)4–15+ cm long; disc corollas 7–12 mm long, lobes often reddish brown or purple distally, hirsutulous adaxially.
 - f. Leaves mostly 1–3 cm long, finely 1–2-pinnatifid; tubes of disc corollas about twice as long as throats; cypselae 3–6 mm long; pappus squamellae all connate 8. *T. subulata*
 - ff. Leaves 6–12(3–25) cm long, 1-pinnate; tubes of disc corollas about as long as throats or shorter; cypselae 6–11 mm long; pappus squamellae not all connate (*T. erecta* complex).
 - g. Involucre cylindric-campanulate, length mostly 2–3 times diam.
 - h. Peduncles 3–8(–15) cm long; involucre 12–20+ mm high, 7–12+ mm diam.; ray corolla laminae 9–12(–25) mm long; disc florets 60–120+, corollas 9–12 mm long 2. *T. erecta*
 - hh. Peduncles 2–5(–9) cm long; involucre 10–13 mm high, 4–7 mm diam.; ray corolla laminae 5–8(–15) mm long; disc florets 12–30+, corollas 7–8 mm long 9. *T. tenuifolia*
 - g. Involucre fusiform-cylindric to narrowly campanulate, length mostly 3–5 times diam.
 - i. Peduncles 1–5 cm long; involucre 15–22 mm high, 3–5 mm diam.; ray corolla laminae 2–6 mm long; disc florets 10–20+, corollas 8–12 mm long 6. *T. microglossa*
 - ii. Peduncles 3–10 cm long; involucre 15–21 mm high, 4–7 mm diam.; ray corolla laminae 4–8+ mm long; disc florets 15–40+, corollas 9–12 mm long 1. *T. elongata*

1. *Tagetes elongata* Willd., Sp. pl. 3:2127. 1803.

— TYPE: "habitat in America calidore" (not seen).

ILLUSTRATION: none found.

Plants associated with the name *Tagetes elongata* are part of a polymorphic complex; see lead "ii" in key and discussion at account of *T. erecta*.

Wooded slopes and clearings in Tropical Deciduous Forest and Savanna; infrequent in Central Depression; 750–1100m. CHIAPAS COLLECTIONS: 28070; 38448; 41586; 46102; 54515.

2. *Tagetes erecta* L., Sp. Pl. 887. 1753.

[— *Tagetes major* Gaertn., Fruct. sem. pl. 2:437, t. 172, f. 4. 1791, nom. superfl.] — TYPE: There is only one sheet in LINN; protologue stated: "Habitat in Mexico."

Tagetes patula L., Sp. Pl. 887. 1753. There is only one sheet in LINN; protologue stated: "Habitat in Mexico." This may prove to be the correct name for plants treated here as *T. tenuifolia* Cav.

ILLUSTRATION: none found.

The names cited above and a dozen or so other names have long been variously applied to members of a polymodal continuum that includes the horticultural "French" and "African" marigolds. Typifications of more than half of the names are uncertain and few authors seem to have agreed on circumscriptions of modal facets of the complex. The following description applies to the whole of the complex as manifested in collections from Chiapas. Four modal aspects (here treated as species 1, 2, 6, and 9) are tentatively diagnosed in the key to species following lead "ff."

Annuals, 1–12+ dm high; leaves mostly opposite, pinnate or pinnatifid, lanceolate to oblanceolate in outline, mostly 6–12(3–25) cm long, principal leaflets 9–25, lance-linear to lanceolate, 15–35(5–55+) mm long, 5–12(2–18) mm wide, margins serrate, some teeth aristate, laminae with 0–4 glands/mm² and most teeth with a submarginal gland at base, faces glabrous or nearly so; heads borne singly or loosely aggregated; peduncles clavate, fistulose, 3–10(1–15+) cm long, bearing 0–3+ setose-pinnatisect bractlets; involucre narrowly cylindric-fusiform to campanulate, 10–22 mm high, 3–12+ mm diam; phyllaries 5–8+, glabrous, tips narrowly to broadly deltate or rounded, puberulent-ciliolate, glands elliptic to linear, 0.5–3 mm long, in submarginal rows or scattered; receptacles convex to conic, 1–5+ mm diam.; ray florets mostly 3–8+ (to 100+ in "double" cultivars), corollas yellow to orange, brown, or red (or particolored), tubes slender, 4–11 mm long, glabrous, laminae flabellate to oval-quadrate, 2–12(–25+) mm long, retuse to emarginate; disc florets 10–120+ (to none in some "double" forms), corollas yellow, often tipped with reddish brown or red, glabrous, 7–12 mm long, tubes 2.5–5 mm long, throats narrowly or openly funnelform, 2.5–5 mm long, lobes lance-linear, unequal, one 2–3.5 mm long, the others 1–2.5 mm long, all hirsutulous-papillate adaxially; style branches 1–3 mm long, abruptly penicillate; cypselae 6–11 mm long, 0.6–1.5 mm diam., somewhat flattened or obscurely 4–5-angled, hirtellous on angles, sometimes on faces as well; pappi of 0–2, scabrelous, subulate-aristate squamellae 6–12 mm long plus 2–4 free

or connate, linear-oblong, erose squamellae 2–6 mm long; $2n = 24, 48$.

Tagetes erecta s. str. (diagnosed at "h" in key) is often ruderal around habitations and along roadways in Evergreen Cloud, Pine-Oak-*Liquidambar*, and Pine-Oak forests; common on Central Plateau, rare in Northern Highlands; 1050–2800 m. Distribution of these widely cultivated and now naturalized plants is ± cosmopolitan in warm climates. CHIAPAS COLLECTIONS: *L* 585 (DS); *L* 2411 (DS); *L* 2412 (DS); *L* 2413 (DS); *L* 2711 (DS); *L* 2716 (DS); *L* 2718 (DS); *PM* 43 (CAS); *SR* 1118 (CAS); *T* 110 (DS); *T* 378 (DS); *T* 551 (DS); *T* 552 (DS); *T* 1350 (DS); *T* 1432 (DS); *T* 1433 (DS); *T* 4559 (CAS); 6161; 7039; 7249; 7452; 7454; 10810; 12446; 12472; 12473; 14739; 26486; 51504; 56833.

3. *Tagetes filifolia* Lag., Gen. sp. pl. nov. 28. 1816.

— TYPE: Grown in Madrid from Mexican seed sent by Sessé and Mocino (MA?).

Diglossus variabilis Cass. in F. Cuvier, Dict. sci. nat., ed. 2. 13: 2241. 1819. — TYPE: "dans l'herbier de M. de Jussieu, deux échantillons de cette espèce, recueillis au Pérou par Joseph de Jussieu" (P?).

Tagetes pusilla Kunth, Nov. gen. sp., ed. fol. 4:152. 1820 [1818]; ed. qto. 4:194. 1820. — TYPE: Ecuador, "crescit prope Chillo Quitensium," *A. von Humboldt and A. J. A. Bonpland s.n.* (P, microfiche!—without locality, date, or collector).

[*Tagetes foeniculacea* Poepp. ex DC., Prodr. 5:646. 1836, not *Tagetes foeniculacea* Desf., 1829. — illegit., de Candolle cited *Diglossus variabilis* Cass. as a synonym. Based on *E. F. Poeppig* 26 in 1832 from Peru (G-DC, microfiche!).]

Tagetes multifida DC., Prodr. 5:646. 1836. — TYPE: Mexico, "ad Lerma," Oct 1827, *J. L. Berlandier* "1145" (G-DC, microfiche!).

Solenotheca tenella Nutt., Trans. Amer. Philos. Soc., ser. 2. 7:372. 1841. — TYPE: Peru, "Near Arequipa," *Curson s.n.* (not seen).

Tagetes silenoides Meyen & Walp., Nov. Actorum Acad. Caes. Leop.-Carol. Nat. Cur. 19(suppl. 1):272. 1843. — TYPE: Peru, Lake Titicaca, *F. J. F. Meyen s.n.* (B, destroyed; photograph ex B in F!).

Tagetes dichotoma Turcz., Bull. Soc. Imp. Naturalistes Moscou 24(3): 72. 1851. — TYPE: Ecuador, "prope Quito," *W. Jameson* 865 (G?).

Tagetes fragrantissima Sessé & Moc., Naturaleza (Mexico City), ser. 2 l:app. 142. 1890 [Pl. N. Hisp.] — TYPE: None designated; description leaves no doubt as to application of the name.

Tagetes scabra Brandegee, Zoe 1:314. 1890. — TYPE: Guatemala, Antigua, collector unknown (UC!).

Tagetes anisata Lillo, Informes Dep. Invest. Industr. Univ. Tucuman 8: 8, f. 3–5. 1918. — TYPE: Argentina, San Javier, Villa Nougues, 1200 m, collector not indicated (LIL?).

Tagetes pseudomicrantha Lillo, Informes Dep. Invest. Industr. Univ. Tucumán 8:7, f. 2. 1918. — TYPE: not designated; use of this name here is based on the illustration.

ILLUSTRATION: see synonymy.

Annuals, to 1(–5) dm high; anise-scented; leaves mostly opposite, blades linear-filiform or 1–2-pinnatifid, mostly 1–3 cm long, obovate-elliptic in outline, lobes 5–11(–15), linear-filiform, 3–15 mm long, 0.5–1.5 mm wide, glands submarginal, faces mostly glabrous, nerves and margins minutely scabrelous; heads borne singly or dichasially aggregated; peduncles 2–35 mm long, bracteolate or not; involucre cylindric-fusiform, becoming narrowly turbinate, 6–10 mm high, 1.5–3 mm diam.; phyllaries 5, glabrous, tips rounded, scarious, ciliolate, setose-cuspidate, glands 0–5/mm², densest distally; receptacles conic, 0.5 mm diam.; ray florets 0–3, corollas white, tubes 2–3 mm long, laminae oval-quadrate, 1.5–2.5 mm long; disc florets 8–15+, corollas yellow, 2.5–4 mm long, glabrous, tubes 1–1.5 mm long, throats narrowly funnelform, 1–1.5 mm long, lobes narrowly lance-ovate, 0.5–0.8 mm long; style branches ca. 0.5 mm long, attenuate, minutely hirtellous; cypselae 4–5 mm long, pubescent, at least proximally; pappi of 2(–5) aristate squamellae 2.5–4 mm long and 2(–5) lance-oval to oval-quadrate, erose to lacerate squamellae 0.5–2 mm long; $2n = 24$.

Often ruderal in clearings and disturbed places in Seasonal Evergreen, Tropical Deciduous, Pine-Oak-Liquidambar, and Pine-Oak forests; common in Northern Highlands, on Central Plateau, in Central Depression, and in Sierra Madre; 750–2440 m. Mex (Baja C., Son., Chih., Sin., Dgo., S.L.P., Nay., Jal., Hgo., Mich., Méx., D.F., Mlos., Pue., Ver., Gro., Oax., Chis.), Guat., Hond., Nic., C.R., Pan.; S.A. (Col. Ven., Ecu., Peru., Bol., Arg.). CHIAPAS COLLECTIONS: *C s.n.*, 31 Aug 1971 (CAS); *C 202* (DS); *C 292* (DS); *GS 396* (CAS); *EL 5324* (DS); *L 2033* (DS); *L 2372* (DS); *L 2486* (DS); *PG 228* (CAS); *T 55* (DS); *T 1225* (DS); *T 1537* (DS); *T 1644* (DS); *T 1729* (DS); *T 1789* (DS); *T 4556* (CAS); *Z 336* (DS); 6042; 7396; 12427; 12499; 121776; 13055; 14138; 20688; 29119; 38439; 46093; 46623; 53063; 53839.

4. *Tagetes foetidissima* DC., Prodr. 5:465. 1836.

— TYPE: “in Mexico (Alam.), ad Guchilacae Cordilleram (Berl.! pl. ex. n. 1043)” (G-DC, microfiche, four sheets!). *Tagetes triradiata* Greenm., Proc. Amer. Acad. Arts 32:310. 1897. — TYPE: Mexico, Pedrigal (lava beds), 2300 m, 12 Oct 1896, C. G. Pringle 6592 (GH; isotypes: F, MO, UC!, US).

ILLUSTRATION: none found.

Annuals, 1–10+ dm high, stems often purplish; leaves mostly opposite, pinnatifid to the narrowly winged rachis, oblanceolate in outline, 3–7+ cm long, lobes 15–25+, narrowly oblanceolate, 6–18 mm long, 1–3 mm wide, serrate, laminae with 0–4 glands/mm², most teeth bearing a submarginal gland at base, faces glabrous; heads (1–)3–9+ in cymiform clusters at ends of branches; peduncles slender, (2–)6–15 cm long, distally dilated, each usually with a pinnatifid bracteole near base; involucre purple or green, narrowly cylindric-urceolate, 12–17 mm high, 3–5 mm diam.; phyllaries 5, glabrous, tips deltate, glands linear, 0.5–2.5 mm long in 1–2 rows; receptacles convex, ca. 2 mm diam.; ray florets 3–5, corollas pale yellow to greenish yellow, tubes very slender, 7–8 mm long, pilosulous with crisped hairs, at least distally, laminae oblong, 2–3 mm long; disc florets mostly 6–10, corollas greenish yellow, ca. 6–8 mm long, tubes 3.5–4.5 mm long, distally pilosulous, throats funnelform, 1.5–2.5 mm long, proximally pilosulous, lobes lance-linear,

1–1.5 mm long; style branches 1–1.5 mm long, penicillate; cypselae subterete to fusiform, 5–6 mm long, evenly appressed-pubescent; pappi of (1–)2, very slender, setaceous squamellae 4–8 mm long plus 2–3 narrow, oblong to quadrate squamellae 0.5–2 mm long.

Open places in Montane Rain, Evergreen Cloud, and Pine-Oak forests; common on Central Plateau and in SE Sierra Madre; 1800–3500 m. Mex. (Jal., Hgo., Mich., Mex., D.F., Mlos., Pue., Ver., Gro., Chis.), Guat., C.R. CHIAPAS COLLECTIONS: *ADS 850* (DS); *L 2257* (DS); *SR 947* (CAS); *T 429* (DS); *T 1298* (DS); *T 1351* (DS); *T 1762* (DS); *TW 2385* (CAS); 7972; 12360; 22043; 22394; 29384; 40694; 41670; 46207; 53881.

5. *Tagetes lucida* Cav., Icon. 3:33., t. 264. 1794.

— TYPE: “Nova Hispania”; grown in Madrid from Mexican seed; the plate is diagnostic.

Tagetes pineda La Llave, Reg. Trimestre 1:358. 1832. — TYPE: Mexico, Oaxaca, near Mitla; no specimen located; included here on basis of description.

Tagetes schiedeana Less., Linnaea 9:271. 1835. — TYPE: Mexico, “prope Hacienda de la Laguna. Aug.” C. J. W. Schiede and F. Deppe *s.n.* (no specimen located).

Tagetes florida Sweet, Brit. Fl. Gard. 2:pl. 35. 1838. — *Tagetes lucida* Cav. f. *florida* (Sweet) Voss, Vilm. Blumengärtn., ed 3. 1:498. 1894. — TYPE: Unknown.

Tagetes anethina Sessé & Moc., Naturaleza (Mexico City), ser 2. 1: app. 142. 1890. [Pl. N. Hispan.] — TYPE: Mexico, “habitat in Sancti Angeli hortis prope Mexicum ubi Hypericum dicitur. Floret Septembri.” — Fl. Mex. Icon. 150.

Tagetes gillettii De Wild., Ann. Mus. Congo, ser. 5 2:213. 1907. — TYPE: Africa, “Kisantu,” ca. 5°S, 15°E, 1900, J. Gillet *s.n.* (BR?).

Tagetes seleri Rydb. in N. L. Britton et al., N. Amer. fl. 34:151. 1915. — TYPE: Mexico, Chiapas, Comitán, 14 Aug 1896, E. Seler 3085 (NY).

ILLUSTRATION: Cav., Icon. 3:33., t. 264. 1794; R. McVaugh, Fl. novo-gal. 12:917. 1984.

Herbaceous or suffrutescent perennials, 1–3(–7+) dm high; leaves mostly opposite, not divided, sessile, blades narrowly oblong-spatulate to oblong or linear, 3–5(–10) cm long, (3–)5–14 mm wide, 1–3-nerved from near their bases, margins serrate, often basally setose, laminae with 4–16 glands/mm², faces glabrous; heads (3–)8–20+ in open or congested, corymbiform clusters (2–)4–10 cm across; peduncles stout to slender, 2–35 mm long, bracteolate; involucre cylindric to narrowly campanulate, 5–6(–10) mm high, 2–3+ mm diam.; phyllaries 5–8, glabrous or puberulent, tips cuspidate, puberulent, glands round, 0.1–0.2 mm diam., obscurely in rows; receptacles conic, 1–2 mm diam., ray florets 3(1–4), corollas yellow to orange, tubes ca. 2 mm long, puberulent, laminae flabellate to quadrate, 3–5 mm long, 4–7 mm wide; disc florets 5–10+, corollas yellow, 4.5–5 mm long, glabrous, tubes ca. 1.5 mm long, throats narrowly funnelform, ca. 2 mm long, lobes lance-linear, ca. 1.5 mm long, papillate adaxially on margins; style branches ca. 1.5 mm long, penicillate; cypselae 5–6 mm long, glabrous or puberulent; pappi of 2–3, subulate-aristate squamellae 1–4 mm long plus 2–4, oblong to quadrate, erose scales 0.5–1.5 mm long, some or all connate.

Pastures, roadsides, open woodlands in Seasonal Evergreen, pine-Oak-*Liquidambar*, and Pine-Oak forests; common on Central Plateau, extending onto Northern and Eastern highlands; 900–2300 m. Mex. (Chih., Coah., N.L., Tam., Sin., Dgo., S.L.P., Nay., Jal., Gto., Qro., Cma., Mich., Méx., D.F., Pue., Ver., Gro., Oax., Chis.), Guat., Hond., Salv.; adventive in Africa. CHIAPAS COLLECTIONS: *A* 1308 (DS); *C&L* 12 (CAS); *C* 365 (DS); *GG* 448 (CAS); *GG* 612 (CAS); *EL* 6745 (DS); *L* 1159 (DS); *L* 1410 (DS); *L* 1461 (DS); *L* 1742 (DS); *L* 1894 (DS); *L* 2057 (DS); *L* 2198 (DS); *L* 2378 (DS); *L* 2499 (DS); *L* 2584 (DS); *M-I* 50 (CAS); *PM* 19 (CAS); *SC* 661 (CAS); *SR* 1058 (CAS); *Se* 3085 (NY); *T* 1025 (DS); *T* 2289 (DS); *T* 2469 (DS); *T* 2693 (DS); *T* 2767 (DS); 6080; 7055; 7509; 7630; 10507; 11280; 12016; 12126; 12541; 12816; 14458; 14597; 15046; 37875; 40754; 40961; 41129; 47081; 47805; 51397; 51646; 52599.

6. *Tagetes microglossa* Benth., Bot. Voy. Sulphur 118. 1845.

— TYPE: Ecuador, near Salango, “462” (BM?).

Tagetes jaliscensis Greenm., Proc. Amer. Acad. Arts 40:47. 1904. — [*Tagetes jaliscana* Rydb. in N. L. Britton et al., N. Amer. fl. 34:157. 1913]. — TYPE: Mexico, Jalisco, “dry rocky mountains above Etzatlán,” 610–915 m, 2 Oct 1903, C. G. Pringle 8768 (GH).

Tagetes jaliscensis Greenm. var. *minor* Greenm., Publ. Field Columbian Mus., Bot. Ser. 2:273. 1907. — [*Tagetes jaliscana minor*] Rydb. in N. L. Britton et al., N. Amer. fl. 34:157. 1913]. — TYPE: Mexico, Oaxaca, “cercañas [cercañas] de Oaxaca,” 1550 m, 8 Nov 1906, C. Conzatti 1516 (F).

ILLUSTRATION: none found.

Plants associated with the name *Tagetes microglossa* are part of a polymorphic complex; see “i” in key to species and discussion of *T. erecta*.

Somewhat ruderal in Seasonal Evergreen, Tropical Deciduous, Pine-Oak-*Liquidambar*, and Pine-Oak forests; common in Central Depression, extending to Northern Highlands, Sierra Madre, and Pacific Coastal Plain; 550–1700 m. Mex. (Jal., Mex., Ver., Chis.), Guat., Nic., Pan.; northern S.A. (Col., Ecu.). CHIAPAS COLLECTIONS: *F&L* 3259 (DS); *P* 9115 (UC); *T* 3083 (DS); *T* 3154 (DS); 13876; 19587; 20407; 20560; 28674; 40613; 46317; 46515; 46611; 53813; 54140; 54478; 70378.

7. *Tagetes nelsonii* Greenm., Proc. Amer. Acad. Arts 39:117. 1903.

— TYPE: Mexico, Chiapas, near Tumbala, 1200–1650 m, 20 Oct 1895, E. W. Nelson 3314 (syntypes: GH, US).

Tagetes sororia Standl. & Steyerma., Publ. Field Mus. Nat. Hist., Bot. Ser. 23:146. 1944. — TYPE: Guatemala, Quezaltenango, mountains N of Olinitepeque, 2500–2800 m, 29 Jan 1941, P. C. Standley 85228 (F).

ILLUSTRATION: Fig. 53.

Shrubs or suffrutices, 1–2+ m high; leaves mostly opposite, pinnate, 6–15 cm long, rachis often setose-bracteolate, leaflets 5–7(–15), ovate to lanceolate or oblanceolate, 3–8 cm long, 10–25 mm wide, sharply serrate, laminae with 0–3 glands/mm², mostly in rows between nerves, both faces usually

puberulent to pilosulous with crisped hairs, sometimes glabrate; heads (12–)30–100+ in congested corymbiform aggregations (4–)8–15 cm across; peduncles clavate, 2–15 mm long, bracteolate; involucre cylindric-campanulate, 5–8(–12) mm high, 2.4–4.5(–6) mm diam.; phyllaries 5–8, glabrous, tips deltate, puberulent-ciliolate, glands elliptic to linear, 0.3–1.5 mm long, obscurely in rows; receptacles convex, ca. 2 mm diam.; ray florets 5–8, corollas greenish yellow, tubes 2–3 mm long, puberulent, laminae narrowly ovate or oblong, 4–8(–15) mm long; disc florets 10–40, corollas greenish yellow, ca. 5–7 mm long, tubes 1.5–2.5 mm long, distally puberulent, throats narrowly funnelform, 2–2.5 mm long, proximally puberulent, lobes lance-linear, 1.3–1.8 mm long, minutely papillate adaxially on margins; style branches 1.5–2 mm long, penicillate; cypselae 3–4-angled, 3.5–4.5 mm long, glabrous or nearly so; pappi of 4–10, oblong to subulate squamellae 0.5–3.5 mm long.

Thickets and wet places in Evergreen Cloud, Pine-Oak-*Liquidambar*, and Pine-Oak forests; common on Central Plateau, extending onto Northern and Eastern highlands; 1700–2700 m. Southern Mex. (Chis.), Guat. CHIAPAS COLLECTIONS: *GL* 480 (CAS); *GG* 166 (CAS); *L* 1477 (DS); *L* 1721 (DS); *L* 2201 (DS); *L* 2384 (DS); *L* 2509 (DS); *Lo* 97 (CAS); *T* 1273 (DS); *T* 1457 (DS); 7144; 12486; 12674; 13726; 21280; 27787; 29225; 40923; 41344; 46360; 47072; 47769; 52960; 53748.

8. *Tagetes subulata* Cerv. in P. La Llave & J. M. Lexarza, Nov. Veg. Descr. 1:31. 1824.

— TYPE: Mexico, “Santuario de Chalma, floret hyeme” (G?).

Tagetes multiseta DC., Prodr. 5:645. 1836. — TYPE: “in Mexico (Alam.! Haenke!), ad Cuernavacum (Berl.! pl. exs. n. 969)” (all G-DC, microfiche!).

ILLUSTRATION: none found.

Annuals, 1–5+ dm high; leaves proximally opposite, distally alternate, all finely 1–2-pinnatifid, oval-elliptic in outline, mostly 1–3 cm long, primary lobes 7–15, lanceolate to linear, 3–15 mm long, 1–3 mm wide, some or all finely setose at tips, ellipsoid glands conspicuous near tips of 1–5 distal lobes, faces glabrous; heads borne singly at ends of branches; peduncles 4–10 cm long, slightly swollen and fistulose distally; involucre greenish or purplish, cylindric-urceolate, 15–20 mm high, 3–6+ mm diam.; phyllaries 5, glabrous but for rounded to deltate, puberulent tips, glands linear, 0.5–2 mm long in 1–2 rows; receptacles convex to hemispheric, 2–3.5 mm diam.; ray florets (3–)5, corollas yellow, tubes very slender, 9–11 mm long, laminae oval-quadrate, 2–3.5 mm long; disc florets 20–40, corollas yellow-ochroleucous with red-purple tips, 10–12 mm long, glabrous, tubes very slender, 5.5–7 mm long, throats narrowly funnelform, 2.5–3.5 mm long, lobes lance-linear, 1–2 mm long, adaxially hirsutulous-papillate; style branches 1–1.5 mm long, abruptly penicillate; cypselae 4–5-angled, 3–6 mm long, glabrous or sparsely appressed-hirtellous; pappi 8–13 mm long overall, usually comprising a connate tube 3.5–7 mm long extending into 1–2 scabrellous, subulate awns or aristae; $2n = 24, 44$.

Open places (ruderal?) in Tropical Deciduous and Pine-Oak forests, Savanna, and Thorn Woodland; frequent in Central

Depression, extending to Northern Highlands, Central Plateau, and Sierra Madre; 600–1100 (–2200) m. Western and southern Mex. (Baja C., Son., Chih., Sin., Nay., Jal., Cma., Mich., Méx., Mlos., Hgo., Gro., Oax., Chis.), Guat., Hond., Salv., Nic., C.R., Pan.; northern S.A. (Col. Ven.). CHIAPAS COLLECTIONS: *P* 6792 (UC); *P* 9109 (UC); 20491; 46302; 46521; 46570; 46778; 54288; 54516; 71057.

9. *Tagetes tenuifolia* Cav., Icon. Pl. 2:54, t. 169. 1793.

— TYPE: ?Mexico; Cavanilles cited, "Habitat in Peru. [annual symbol] Vulgo dicta Chinchimali. Vidi floridam in Regio Matritense mense Decembri"; the plate is a fair match for Mexican plants that have long been called *T. tenuifolia*. This may prove to be conspecific with type of *Tagetes patula*.

ILLUSTRATION: see protologue.

Plants associated with the name *Tagetes tenuifolia* are part of a polymorphic complex; see "hh" in key to species and discussion of *T. erecta*.

Often ruderal in Montane Rain, Evergreen Cloud, and Pine-Oak forests; common on Central Plateau, rare in Northern Highlands, Central Depression, and SE Sierra Madre; 860–2700 m. Widely cultivated and naturalized in warm climates. CHIAPAS COLLECTIONS: *F* 3262 (CAS); *L* 60 (DS); *L* 2172 (DS); *L* 2272 (DS); *L* 2398 (DS); *L* 2514 (DS); *L* 2585 (DS); *Lo* 92 (CAS); *SR* 216 (CAS); *SR* 315 (CAS); *SR* 1088 (CAS); *T* 1470 (DS); 7295; 13062; 13155; 13301; 13763; 29218; 40565; 41131; 41300; 46049; 46214; 46308.

10. *Tagetes terniflora* Kunth, Nov. gen. sp., ed. fol. 4:153. 1820 [1818]; ed. qto. 4:196. 1820.

— TYPE: Ecuador, "Crescit prope Quito in radicibus montis Pichinchae, alt. 1500 hex. [2700 m]," Jun, *A. von Humboldt and A. J. A. Bonpland s.n.* (P, microfiche!).

Tagetes gigantea Carrière, Rev. Hortic. 58:107. 1886. — TYPE: Grown in France from Bolivian seed via "MM. Vilmorin et Cie."; no specimen seen.

Tagetes cabreræ M. Ferraro, Bol. Soc. Argent. Bot. 6(1):38, f. 2. 1955. — TYPE: Argentina, Salta, Capital, San Lorenzo, 28 May 1933, *A. Cabrera* 3033 (LP).

ILLUSTRATION: A. Cabrera, Fl. Prov. Jujuy XIII(X):446., fig. 187. 1978.

Annuals, to 2 m high; leaves mostly opposite, pinnatifid or pinnate, elliptic in outline, 5–10+ cm long, rachis narrowly winged, lobes mostly 7–13, lanceolate to lance-linear, 15–45 mm long, 3–12 mm wide, serrate, laminae with 0–4 glands/mm², most teeth each with a gland at the base, faces glabrous; heads up to 150 in densely aggregated cymiform clusters, the clusters to 15–20 cm across; peduncles very slender, 2–15 mm long, often with subulate bracteoles; involucre greenish, urceolate-fusiform, sometimes flattened-trigonal, 7–10 mm high, 2–5 mm diam; phyllaries 2–5, glabrous, tips deltate-rounded, puberulent, glands linear-elliptic to linear, 0.5–1.5 mm long; receptacles convex, 0.5–1.5 mm diam.; ray florets 1–4, corollas pale yellow, tubes slender, 3–4 mm long, puberulent, laminae oval-quadrate, 1.5–2.5 mm long; disc florets 0–10, greenish yellow, 4–5 mm long, tubes 2–2.5 mm long, distally puberulent, throats narrowly funnelform, 1.5–2 mm long, proximally puberulent, lobes deltate-ovate, 0.5–0.8 mm long; style branches ca. 1 mm long, abruptly penicillate; cypselae subterete to fusiform, 4–6 mm long, closely appressed-pubescent; pappi of 6–10 squamellae, 1–2 aristate, 3–4 mm long, the others linear-oblong, erose, 0.3–1 mm long.

Ruderal, naturalized in vicinity of San Cristóbal de Las Casas. Native to Andean South America (Ven. to Arg.). CHIAPAS COLLECTIONS: *Kl.s.n.* Mar 1977 (CAS); 40843; 71398.

Sometimes, some heads within a capitulescence of *T. terniflora* have 1–2 ray florets and no disc florets.

70. TETRACHYRON

Tetrachyron Schldtl., Linnaea 19:744. 1847. — *Calea* L. subg. *Tetrachyron* (Schldtl.) B. L. Rob. & Greenm., Proc. Amer. Acad. Arts 32: 29. 1896. — TYPE: *Tetrachyron manicatum* Schldtl.

Calea L. subg. *Tephrocallea* (A. Gray) B. L. Rob. & Greenm., Proc. Amer. Acad. Arts 32:30. 1896. — Based on "*Calea* (*Tephrocallea*) *tomentosa*" and "*Calea* (*Tephrocallea*) *discolor*" of A. Gray, Proc. Amer. Acad. Arts 15:38. 1880 [1879]. — LECTOTYPE: to be designated.

Shrubs, to 6 m high; leaves opposite, conspicuously petiolate to subsessile, blades often coriaceous, ovate or trullate to lanceolate or linear, triplinerved from near their bases or pinnatinerved, margins entire or serrate, faces glabrous or pilosulous to tomentose or lanate, sometimes stipitate-glandular as well; heads borne singly or in loose, bracteolate, corymbiform clusters; involucre obconic to hemispheric, 4–14 mm high; phyllaries mostly 12 in 2–3 series, graduate, herbaceous-chartaceous, deltate or ovate to lanceolate or oblanceolate, abaxially glabrous or pilosulous to tomentose, margins often scarious, apices acuminate to obtuse; receptacles conic; paleae chartaceous, oblong or elliptic, shorter than the florets, otherwise similar to innermost phyllaries; ray florets 4–25, pistillate, fertile, corollas yellow (often drying white), tubes stout, glabrous or sparsely pilosulous, laminae ovate to elliptic or oblong 2–14 mm long, often strongly nerved; disc florets 20–150, bisexual, fertile, corollas yellow, sometimes with pellucid, orange nerves, tubes stout, shorter than or equal to the gradually or abruptly dilated, funnelform or campanulate throats, lobes 5, deltate; style branches stout, stigmatic almost to the slightly dilated tips; cypselae blackish, narrowly obpyramidal, (3–)4-angled, glabrous or sparsely to densely pilosulous; pappi of (3–)4, lance-subulate to spatulate squamellae (one on each shoulder of a cypselae) plus 0–8 interspersed, shorter, cuneate to subulate, erose to lacerate squamellae; $x = 16$.

Five or six, little-collected species from eastern and southern Mexico and Guatemala.

REFERENCE: WUSSOW, J. R. and L. E. URBATSCH. 1979. A systematic study of the genus *Tetrachyron* (Asteraceae: Heliantheae). Syst. Bot. 4: 297–318.

1. ***Tetrachyron orizabaensis* (Klatt) Wussow & Urbatsch, Syst. Bot. 4:312. 1979 [1980].**

— *Calea orizabaensis* Klatt, Leopoldina 23:145. 1887. — [*Tetrachyron orizabaensis* Schultz-Bip. ex Klatt, pro syn. sub *Calea orizabaensis*, loc. cit.] — TYPE: Mexico, Veracruz, Pico Orizaba, 8000–10,000 ft. [2440–3048 m], F. M. Liebmann “390” (10.956) (C; isotypes: GH, US).

All Chiapan collections of this species are referable to:

1a. ***Tetrachyron orizabaensis* (Klatt) Wussow & Urbatsch var. *orizabaensis*.**

Calea guatemalensis Donn.Sm., Bot. Gaz. 23:9. 1897. — TYPE: Guatemala, Huehuetenango, between San Martín and Todos Santos, 7000–8500 ft. [2134–2592 m], Dec 1895, E. W. Nelson 3634 (US; isotype: US).

Calea rupestris Brandegee, Zoe 5:258. 1908. — TYPE: Mexico, Puebla, “Boca del Monte and Esperanza,” Jun 1907, C. A. Purpus 2464 (UC; isotypes: F, GH, MO, NY, US).

ILLUSTRATION: Syst. Bot. 4:310. 1979.

Shrubs, to 2(–6) m high; petioles 3–25 mm long, very narrowly winged, leaf blades lanceolate to lance-ovate, 5–16 cm long, 2–6 cm wide, bases broadly to narrowly cuneate, margins entire to remotely serrate, apices acute to acuminate, abaxial faces pale, sparsely and finely piloso-hirsute (often only on

nerves) or glabrous, adaxial faces glabrous or nearly so; heads (12–)30–130 in bracteolate, corymbiform aggregations (3–)8–25 cm across; peduncles 2–12(–25) mm long, glabrous or pilosulous; involucre conic-campanulate, 4–6 mm high; phyllaries 12–15 in 3 series, imbricate, greenish or stramineous, herbaceous to chartaceous, ovate to lanceolate or oblanceolate, striate, glabrous or sparsely pilosulous, margins scarious, often ciliolate; receptacles conic; paleae golden-stramineous, chartaceous-scarious, narrowly oblong, navicular, 3.5–4.5 mm long, obtuse, glabrous or sparsely pilosulous; ray florets 8–13, corollas yellow (fading to cream or white), tubes stout, ca. 1 mm long, laminae ovate to oblong, 4–8 mm long, prominently 5–6-nerved; disc florets mostly 20–40, corollas golden yellow, often with orange nerves, glabrous, tubes stout, 0.8–1.2 mm long, throats cylindric-funnelform, 1.3–1.6 mm long, lobes deltate, 0.6–1 mm long; style branches stout, 0.6–0.8 mm long stigmatic almost to the dilated, papillate-hispidulous tips; cypselae blackish, narrowly obpyramidal, 4-angled, 2.5–3 mm long, sparsely hirsutulous; pappi of 4, lance-linear to subulate squamellae 1–1.5 mm long plus 0–8 interspersed, cuneate, erose squamellae 0.2–0.5 mm, long; $2n = 32$.

Mesic, brushy slopes in Montane Rain, Evergreen Cloud, and Pine-Oak-Liquidambar forests; local in Northern and Eastern highlands and in Sierra Madre; 1300–2900 m. Eastern Mex. (Pue., Ver., Chis.), Guat. CHIAPAS COLLECTIONS: *EM 4685* (LL); *SR 466* (CAS, TEX); *SR 554* (CAS, TEX); *SR 684* (CAS, TEX); 9767; 29209; 31401; 31815; 37089; 49700; 49949; 52246; 53325; 58386; 67796.

71. TITHONIA

Tithonia Desf. ex A. L. Juss., Gen. 189. 1789. — TYPE: *Tithonia uniflora* J. G. Gmel. = *Tagetes rotundifolia* Mill. ≡ *Tithonia rotundifolia* (Mill.) S. F. Blake.

Tithonia Desf. subg. *Mirasolia* Schultz-Bip. in B. C. Seemann, Bot. Voy. Herald 305. 1856. — *Mirasolia* (Schultz-Bip.) Benth. in G. Benthams and J. D. Hooker, Gen. pl. 2:367. 1873. — TYPE: *Tithonia calva* Schultz-Bip.

Urbanisol Kuntze, Revis. gen. pl. 1:370. 1891. — illegit. substitute for *Tithonia* Desf.

Coarse, annual or perennial herbs, or shrubs, to 4 m high, stems commonly pilose; proximal leaves opposite, the distal alternate, typically all petiolate, blades usually lanceolate to deltate or pentagonal, triplinerved, sometimes 3–5-lobed, margins subentire to dentate, faces subglabrous to pilose or scabrous, often resinous-gland-dotted; heads borne singly or loosely aggregated at ends of branches; peduncles typically 10–20+ cm long, usually swollen and fistulose distally, subglabrous to shaggy-pilose; involucre campanulate to hemispheric, mostly 1–2 cm diam.; phyllaries 12–26 in 2–4, subequal to strongly graduated series, variously ovate to lance-linear, proximally indurate, distally herbaceous to membranous, glabrous or shaggy-pilose; receptacles slightly convex to conic-ovoid; paleae persistent, mostly scarious-chartaceous, conduplicate, often carinate, distally indurate, often abruptly acute or mucronate; ray florets 8–30, neuter, corollas yellow to reddish orange, tubes stout, glabrous, laminae ovate to narrowly oblong or linear; disc florets (50–)100–200+, bisexual, fertile, corollas yellow, tubes very short, throats bulbous-ampliate, thickened, usually laterally flattened or compressed at base, distally contracted and ± cylindric, usually scabrellous to hispidulous, at least proximally, lobes 5, deltate to lance-triangular; filaments flattened, glabrous or papillate to pilosulous; style branches slender, hispidulous, penicillate-dilated to attenuate; cypselae blackish to buffy, notably compressed, or biconvex, or flattened, weakly quadrate in cross section, cuneiform in outline, glabrous or antrorsely hairy; pappi none or erose to fimbriate or lacinate coronas of free or connate squamellae plus 0–2 scabrellous, subulate, ± aristate squamellae; $x = 17$.

A dozen or so species ranging from southwestern United States and northwestern Mexico south and east to Costa Rica, perhaps adventive farther south in Panama, Venezuela, Ecuador, and Argentina; adventive in Old World.

REFERENCE: LA DUKE, J. C. 1982. Revision of *Tithonia*. *Rhodora* 84:453–522.

- a. Phyllaries strongly graduated, outer much shorter than inner; mucros of inner paleae mostly 0.5–2 mm long.
- b. Petioles mostly 2–6 cm long, often auriculate at base; leaf blades mostly rhombic to deltate, often some 3–5-lobed; paleae 9–12 mm long; ray florets 12–13, corolla laminae (4–)5–7 cm long 1. *T. diversifolia*
- bb. Petioles wanting or to ca. 1 cm long, not auriculate; leaf blades mostly lanceolate, not lobed; paleae 6–8 mm long; ray florets 18–21(13–30), corolla laminae 20–45 mm long 2. *T. longiradiata*
- aa. Phyllaries subequal or outer longer than inner; mucros of inner paleae 2–5 mm long.
- c. Leaf blades often 3-lobed, abaxially glabrate or sparsely hirtellous; paleae seldom surpassing florets; cypselae 6–7 mm long 3. *T. rotundifolia*
- cc. Leaf blades not lobed, abaxially softly pilose to subsericeous; paleae typically surpassing florets; cypselae 3.5–5 mm long.
- d. Peduncles and phyllaries closely pilose with hairs 1–(2–)3 mm long; phyllaries (20–)24–28, 16–25 mm long, 1.2–2.5(–3) mm wide; ray corollas strongly resinous-gland-dotted abaxially. [see discussion at 4. *T. tubaeformis*]
- dd. Peduncles and phyllaries shaggy pilose with hairs 3–5 mm long; phyllaries 15–18(–21), 15–22 mm long, (3–)4–7+ mm wide; ray corollas not at all or only sparsely resinous-gland-dotted abaxially 4. *T. tubaeformis*

1. *Tithonia diversifolia* (Hemsl.) A. Gray, Proc. Amer. Acad. Arts 19:5. 1883.

— *Mirasolia diversifolia* Hemsl. in F. Godman and O. Salvin, Biol. cent.-amer., Bot. 2:168, t. 47. 1881. — LECTOTYPE: (Blake 1921): Mexico, Veracruz, Valley of Orizaba, *E. Bourgeau* 2319 (K; isoelectotypes: BR, FI, GH, S, US).

Urbanisol tagetifolius Kuntze var. *diversifolius* Kuntze, Revis. gen. pl. 1:370. 1891. — nom. nud.?; no type designated; treatment here follows La Duke 1982.

Urbanisol tagetifolius Kuntze f. *grandiflorus* Kuntze, Revis. gen. pl. 1:370. 1891. — TYPE: "Singapur, ex wildert"; no specimen seen; treatment here follows La Duke 1982.

Urbanisol tagetifolius Kuntze γ (subforma?) *flavus* Kuntze, Revis. gen. pl. 1:371. 1891. — TYPE: "Singapur," Oct 1875, O. Kuntze 6074 (NY; isotype: K).

Tithonia triloba Schultz-Bip. in F. M. Liebmman, Pl. Mex. no. 603, fide Klatt (Bull. Soc. Roy. Bot. Belgique 3:203. 1892), pro syn. sub *Tithonia speciosa* Klatt, non *Tithonia speciosa* (Hook.) Hook. ex Griseb., 1866; treatment here follows La Duke 1982.

Helianthus quinquelobus Sessé & Moc., Fl. mexic., ed. 2. 193. 1894. — LECTOTYPE: (La Duke 1982): Mexico, Veracruz, Orizaba, *M. Sessé* and *J. M. Mociño s.n.* (MA 2936).

Tithonia diversifolia (Hemsl.) A. Gray subsp. *glabriuscula* S. F. Blake, Contr. U.S. Natl. Herb. 20:435. 1921. — TYPE: Mexico, Oaxaca, north of Tuxtepec, 90 m, 9 Apr 1894, *E. W. Nelson* 346 (US).

ILLUSTRATION: Hemsley, W. B. 1881. In F. Godman and O. Salvin, Biol. cent.-amer., Bot. 2:t. 47.

Coarse herbs or shrubs, to 3 m high; petioles mostly 2–6 cm long, winged, at least distally, often basally auriculate, leaf blades lance-ovate to rhombic, deltate, or pentagonal, often 3- or 5-lobed, mostly 10–20 cm long, 6–18 cm wide, bases cuneate, margins crenate to coarsely dentate, apices acuminate, abaxial faces usually densely pilosulous with fine, crisped hairs, rarely nearly glabrous, minutely resinous-gland-dotted, adaxial faces minutely scabrellous; heads scattered; peduncles mostly 8–15 cm long, glabrate or closely villous with crisped hairs 0.5–1.5 mm long; involucre hemispheric; phyllaries mostly 18–26, unequal in 3–4 series, the outer ovate to orbicular, 5–8

mm long, the inner oblong to broadly obovate, 12–27 mm long, distally membranous, all sparsely puberulent or glabrous; receptacles convex to ovoid; paleae stramineous to hyaline, scarious to chartaceous, often carinate, 9–12 mm long, stoutly pungent with mucros 0.5–2 mm long, sparsely hirtellous; ray florets 12–13, corollas bright yellow to orange, tubes ca. 2 mm long, laminae narrowly spatulate, mostly (4–)5–7 cm long; disc florets 120–180+, corollas yellow, tubes ca. 1 mm long, throats 5–6 mm long, tubes and bases of throats hispidulous, lobes lance-triangular, ca. 1.5 mm long, abaxially subglabrous, adaxially papillate; filaments glabrous; style branches ca. 3 mm long, hispidulous, attenuate; cypselae blackish to olive-brown, 4–6 mm long, glabrous or sparsely antrorsely pubescent; pappi erose to lacerate coronas of mostly connate squamellae 0.3–2.5 mm long plus 0–2 lance-subulate, aristate squamellae 3–5 mm long; $2n = 34$; flowering mostly Sep–Oct.

Shrubby or wooded slopes, sometimes along streams, mostly in Pine-Oak-*Liquidambar* and Pine-Oak forests, exceptionally in Lower Montane Rain and Seasonal Evergreen forests; common on Central Plateau and Sierra Madre, less so in lower Northern Highlands, in Eastern Highlands, and on Pacific Coastal Plain; (85–)1000–1850+ m. Southern Mex. (Sin., Mich., Ver., Gro., Oax., Yuc., Chis.), Guat., Nic., C.R., Pan.; adventive in Antill., S.A. (Col., Ven., Ecu.), and Old World tropics. CHIAPAS COLLECTIONS: *Crq* 9674 (TEX); *Hi* 25 (CAS); *RMK* 2769 (TEX); *L* 1836 (DS); *L* 2280 (DS); *L* 2423 (DS); *L* 2569 (DS); *Lu* 17887 (CAS, LL); *Mz* 9537 (TEX, UC); *Mz* 10575 (TEX); *EM* 6160 (CAS, LL); *EM* 6183 (LL); *Neff* 93-4-26-1 (TEX); *PG* 135 (CAS); *PG* 275 (CAS, TEX); *SC* 283 (TEX); *Sin* 1132 (TEX); *SI* 2077 (TEX); *SI* 2090 (TEX); *T* 169 (DS); *T* 1690 (DS); *T* 1779 (DS, LL); *T* 1885 (DS, LL); *T* 2057 (DS); *T* 2113 (DS); *T* 3509 (DS, LL); *T* 9341 (TEX); *We* 11702 (DS); 7233A; 7272; 7491; 11297; 13781; 28569; 45919; 46311; 46628; 56814.

2. *Tithonia longiradiata* (Bertol.) S. F. Blake, Bull. Torrey Bot. Club 53:217. 1926.

— *Helianthus longiradiatus* Bertol., Novi Comment. Acad. Sci. Inst. Bononiensis 4:436. 1840 [Fl. Guat.]. — NEOTYPE (La Duke 1982): Guatemala, Sacatepeque, Volcán de Agua, 7 Aug 1962, *G. L. Webster et al.* 12844 (MICH; isoneotypes: F, LL, MO).

Tithonia scaberrima Benth., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 4:91. 1853. — [*Tithonia platylepis* Schultz-Bip. in F. M. Liebmam, Pl. Mex., fide G. Bentham in G. Bentham and J. D. Hooker, Gen. pl. 2:368. 1873, pro syn., sub *Tithonia scaberrima* Benth.] — *Mirasolia scaberrima* (Benth.) Benth. ex Hemsl. in F. Godman and O. Salvin, Biol. cent.-amer., Bot. 2:168. 1881. — *Gymnolomia platylepis* A. Gray, Proc. Amer. Acad. Arts 19:5. 1883. — nom. superfl., illegit. — *Gymnolomia scaberrima* (Benth.) Greenm., Publ. Field Columbian Mus., Bot. Ser. 2: 268. 1907. — TYPE: Nicaragua, "Jey fandt deme, ved sine store Blomstorkurve og ved sine meget rue Blade udmaerkede Art i Fyrtretvaereenes Region i Provindsen Segovia i Naerheden af Chinotega (c. 5000' [ca. 1524 m])," A. S. Oersted s.n. (C; isotype: C).

Gymnolomia decurrens Klatt, Leopoldina 23:90. 1887. — [*Perimeniopsis perfoliata* Schultz-Bip. fide Klatt, loc. cit.] — TYPE: Mexico, "Mirador," *Sartorius* s.n. (no specimen seen; treated as synonym of *T. longiradiata* by La Duke 1982).

Tithonia glaberrima Kuntze, Revis. gen. pl. 1:371. 1891. — nom. nud?; illegit. substitute for *Tithonia scaberrima* Benth.?

Gymnolomia pittieri Greenm., Proc. Amer. Acad. Arts 39:101. 1903. — *Tithonia pittieri* (Greenm.) S. F. Blake, Contr. Gray Herb. 54:9. 1918. — LECTOTYPE: (La Duke 1982): Costa Rica, "bords du Rio Ceibo à Buenos Aires," 200 m, Feb 1891, *H. Pittier* 3735 (GH; isolectotypes: BR, CR).

ILLUSTRATION: Fig. 54.

Coarse herbs or shrubs, 1–2(–4) m high, stems often pilose; petioles wanting or to ca. 1 cm long (if longer, broadly winged and continuous with blades), leaf blades narrowly lanceolate to rhombic-ovate, 8–18+ cm long, 2–10 cm wide, bases broadly to narrowly cuneate, margins subentire to crenate, apices acuminate, abaxial faces densely pilosulous and minutely resinous-gland-dotted, adaxial faces scabrellous; heads scattered or loosely aggregated; peduncles mostly 4–15 cm long, usually pilose-hispid with hairs 0.5–3 mm long; involucre hemispheric; phyllaries 18–24 in 3–4 series, the outer lance-oblong to ovate, mostly 4–8 mm long, the inner oblong to broadly obovate, 13–18+ mm long, all basally indurate, densely pilose to scabrellous, distally herbaceous to membranous and glabrate; receptacles convex; paleae stramineous, chartaceous, navicular, carinate, 6–8 mm long, abruptly stoutly pungent with mucros 0.5–2 mm long, sparsely hairy distally; ray florets 18–21(13–30), corollas yellow to pale orange, tubes ca. 1 mm long, laminae narrowly oblong, 20–45 mm long; disc florets ca. 150–200, corollas yellow, tubes 0.7–1.1 mm long, glabrous, throats 3.7–4.3 mm long, thickened and scabrellous at their bases, lobes deltate to lance-triangular, ca. 1 mm long, abaxially scabrellous, adaxially minutely papillate; filaments minutely papillate; style branches 2–2.5 mm long, hispidulous, abruptly deltoid-penicillate; cypselae blackish to gray, 3–4.5 mm long, somewhat warty, glabrous; pappi none; flowering Nov–Feb.

Shrubby or wooded slopes in Lower Montane rain, Evergreen Cloud, Evergreen Seasonal, Tropical Deciduous, Pine-Oak-Liquidambar, and Pine-Oak forests; common on Central Plateau, less so in Northern Highlands, Eastern Highlands, in Sierra Madre, and along upper edge of Central Depression; 700–2700 m. Southern Mexico (S.L.P., Hgo., Pue., Ver., Oax., Chis.), Guat., Hond., Salv., Nic., C.R. CHIAPAS COLLECTIONS: Br

614 (TEX); Cb 3768 (UC); Cro 46294 (UC); Cro 47681 (MO, UC); Cro 64884 (UC); Cro 65108 (UC); Cro 66124 (TEX, UC); Crq 10476 (DS, TEX); Ga 591 (TEX); GS 36 (TEX); GS 272 (CAS); GS 385 (CAS); GG 284 (CAS); GG 328 (CAS, TEX); GV 8 (CAS); GV 11 (CAS); He 2210 (TEX); Kim 10042 (TEX); Kl 800 (TEX); Kl 801 (TEX); LaD 515 (TEX); Lan 800 (TEX); Lan 801 (TEX); L 427 (DS); Lav 4518A (TEX); Mz 8567 (TEX, UC); Nee 32359 (TEX, UC); Pa 198 (CAS); PG 128 (TEX); PG 181 (CAS, TEX); PG 247 (TEX); PM 157 (CAS); PM 235 (CAS); Prat 1120 (CAS, TEX); R&B 19824 (DS); SI 2957 (TEX); Spo 2777 (TEX, UC); T 521 (DS, LL); T 570 (DS, LL); T 1805 (DS); T 1886 (DS); T 1935 (DS); T 1954 (DS); T 2056 (DS, LL); T 2112 (DS); T 3508 (DS, LL); T 3687 (DS); T 3947 (DS); TW 2399 (TEX); Z 755 (DS); 6273; 7935; 7948; 8821; 9329; 13891; 23878; 23967; 30974; 42591; 47032; 47583; 48637; 53071; 56813; 60212; 72599.

3. *Tithonia rotundifolia* (Mill.) S. F. Blake, Contr. Gray Herb. n.s. 52: 41. 1917.

— *Tagetes rotundifolia* Mill., Gard. dict., ed. 8. no. 4. 1768. — TYPE: Grown in England from seed gathered in Mexico, Veracruz, *W. Houstoun* s.n. (BM).

Tithonia uniflora J. F. Gmel., Syst. nat., ed. 1791. 1259, t. 2. 1792. No specimen seen; treated as synonym of *Tithonia rotundifolia* by La Duke 1982.

Tithonia tagetiflora Lam., Tabl. encyl. t. 708. 1797. — TYPE: not seen; use of this name here is based on the illustration.

Tithonia tagetiflora Desf., Ann. Mus. Natl. Hist. Nat. 1:46, t. 4. 1802. — nom. superfl., illegit. Based on plants grown in Paris from seed gathered in Veracruz by *Thiery* (P).

Helianthus speciosus Hook., Bot. Mag. 61:pl. 3295. 1834. — *Leighia? speciosa* (Hook.) DC., Prodr. 5:583. 1836. — *Tithonia speciosa* (Hook.) Hook. ex Griseb., Cat. pl. Cub. 155. 1866. — [*Tithonia speciosa* (Hook.) Klatt, Bull. Soc. Roy. Bot. Belgique 3:203. 1892, comb. superfl.] — TYPE: Grown in Kew Gardens from unknown source (K).

Tithonia aristata Oersted, Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 4:114. 1852. — *Urbanisol aristatus* (Oersted) Kuntze, Revis. gen. pl. 1:317. 1891. — TYPE: "Jey fandt den paa Bjerget Aguacate i Costa-Rica," A. S. Oersted s.n. (no specimen seen; treatment here follows La Duke 1982).

Tithonia heterophylla Griseb., Bonplandia 6:9. 1858. — *Urbanisol heterophyllus* (Griseb.) Kuntze, Revis. gen. pl. 1:371. 1891. — TYPE: "Ins. Taboga pr. Panam: Duch., 1810, E. P. Duchassaing s.n. (GOET; isotype: GOET).

Tithonia macrophylla S. Watson, Proc. Amer. Acad. Arts 26:140. 1891. — TYPE: Mexico, Jalisco, barranca near Guadalajara, 25 Sep 1889, C. G. Pringle 2798 (US; isotypes: F, GH, MICH, NY, US).

Urbanisol tagetifolius Kuntze α (subforma?) *normalis* Kuntze, Revis. gen. pl. 1:370. No specimen seen; treated as synonym of *Tithonia rotundifolia* (Mill.) S. F. Blake by La Duke 1982).

Urbanisol tagetifolius Kuntze β (subforma?) *speciosus* Kuntze, Revis. gen. pl. 1:370. 1891. No specimen seen; treated as synonym of *Tithonia rotundifolia* (Miller) S. F. Blake by La Duke 1982).

Tithonia vilmoriniana Pamp., Boll. Soc. Bot. Ital. 1908:133. 1908. — TYPE: "Culta in Horto Botanico Florentino e seminibus mexicanus, pr. Jacona (Michoacan) lectis et a

cl. Vilmorin-Andrieux missis" (specimen in FI, fide La Duke 1982).

ILLUSTRATIONS: see synonymy.

Coarse, annual or perennial herbs, 1–2(–3) m high; petioles mostly 3–8 cm long, narrowly winged, at least distally, leaf blades mostly deltate to deltate-ovate, often 3-lobed, 9–18+ cm long, 6–15+ cm wide, bases subtruncate-cuneate to cordate-cuneate, margins subentire to crenate or coarsely toothed, apices attenuate, abaxial faces glabrate or sparsely hirtellous, mostly along veins, minutely resinous-gland-dotted, adaxial faces more coarsely hirtellous; heads borne singly; peduncles 12–30+ cm long, closely pilose with hairs ca. 1 mm long; involucre broadly campanulate to hemispheric; phyllaries 12–15 in 2–3 series, lance-ligulate to ovate, mostly 17–22 mm long, 4–10 mm wide, basally indurate, distally herbaceous, the outer often squarrose to reflexed at tips, the inner shorter, broader, all closely puberulent to scabrellous with hairs less than 1 mm long; receptacles conic to ovoid; paleae stramineous, chartaceous, often carinate, mostly 12–14 mm long, seldom surpassing florets, distally scabrellous, pungent with mucros 2–4 mm long; ray florets 9–13, corollas yellow-orange to red-orange, tubes stout, ca. 1.5 mm long, laminae ovate to broadly oblong, mostly 15–25+ mm long; disc florets ca. 120–160, corollas yellow, tubes stout, 0.8–1.3 mm long, subglabrous, throats 6–7 mm long, thickened and densely scabrellous at bases, lobes lance-triangular, 1.5–2 mm long, sparsely hirtellous abaxially, minutely papillate adaxially; filaments minutely hairy; style branches 3.5–4 mm long, hispidulous, attenuate; cypselae blackish, often with buffy mottlings, 6–7 mm long, glabrous or antrorse-pubescent; pappi erose to lacerate coronas of mostly connate squamellae 1–2.5 mm high plus 2 subulate-aristate squamellae 3–6 mm long; $2n = 34$; flowering mostly Sep–Nov.

Ruderal in Evergreen Seasonal and Tropical Deciduous forests; common in Central Depression and lower Sierra Madre and on Pacific Coastal Plain; 80–1250 m. Widespread in Mex. (Coah., Nay., Jal., Cma., Ver., Gro., Yuc., Chis.), Guat., Bel., Hond., Salv., Nic., Pan.; adventive in S.A. (Ven., Arg.) and in Old World tropics. CHIAPAS COLLECTIONS: *JTB 14359* (TEX); *WB 1075* (DS); *Hi 7* (CAS); *RMK 3433* (TEX); *L 2612* (DS); *Mz 8691* (TEX); *Mz 19931* (TEX); *EM 6179* (LL); *Neff 93-4-17-1* (TEX); *Prat 1088* (TEX); *SI 2385* (TEX); *SI 2404* (TEX); *Sund 2408* (TEX); *T 3265* (DS); *T 9391* (TEX); *Ve 4956* (CAS); *19855*; *28040*; *28570*; *30378*; *36739*; *38119*; *40601*; *54035*.

4. *Tithonia tubaeformis* (Jacq.) Cass. in F. Cuvier, Dict. sci. nat., ed. 2. 35:278. 1825.

— *Helianthus tubaeformis* Jacq., Pl. hort. schoenbr. 3: 65, t. 375. 1798. — *Tithonia helianthoides* J. A. Weinm. ex Steud., Nomencl. bot., ed. 2. 2:689. 1841, pro syn. sub *Tithonia tubaeformis* (Jacq.) Cass. — *Urbanisot tubiformis* (Jacq.) Kuntze, Revis. gen. pl. 1: 371. 1891. — TYPE: Grown from Mexican seed; no specimen seen; use of this name here is based on the illustration.

Helianthus tubaeformis Ortega, Nov. pl. descr. dec. (8):101. 1798. — LECTOTYPE (La Duke 1982): Grown in Spain from seeds ex "Nova Hispanae," *D. de la Cal s.n.* (MA).

Tithonia helianthoides Bernh., Allg. Teutsch. Gart. Mag. 2:156, pl. 15. 1826. — TYPE: no specimen seen; use of this name here is based on the illustration.

Tithonia tubaeformis (Jacq.) Cass. var. *bourgaena* Pamp., Boll. Soc. Bot. Ital. 1908:134. 1908. — TYPE: Mexico, "Vallee de Cordova," 20 Dec 1865, *E. Bourgeau 1566* (FI; isotype: K).

ILLUSTRATIONS: see synonymy.

Coarse, annual or perennial herbs, to 2(–4) m high; petioles mostly 2–4 cm long, leaf blades narrowly lance-rhombic to deltate-ovate, mostly 6–20 cm long, 3–18 cm wide, bases broadly to narrowly cuneate, margins subentire or serrate, apices acuminate to attenuate, abaxial faces softly pilose to subsericeous with very fine hairs and minutely resinous-gland-dotted, adaxial faces finely scabrellous; heads scattered; peduncles (6–)12–20 cm long, densely softly pilose-hispid with hairs 3–5 mm long; involucre hemispheric to broadly campanulate; phyllaries 15–18(–21) in 2–3 series, subequal, lance-oblong to oblanceolate, 15–22 mm long, (3–)4–7+ mm wide, basally indurate, distally herbaceous, slightly amplate, acute to acuminate, abaxially densely pilose with hairs 2.5–4+ mm long, adaxially strigose toward apex; receptacles slightly convex; paleae stramineous to purplish, scarious-chartaceous, minutely, if at all, carinate, 10–16 mm long, typically surpassing florets at anthesis, abruptly pungent with mucros 3–5 mm long; ray florets 10–18, corollas yellow to yellow-orange, tubes ca. 2 mm long, laminae oblong, 20–35 mm long, sparsely, if at all, resinous-gland-dotted abaxially; disc florets ca. 150–200, corollas yellow, tubes 0.5–0.7 mm long, glabrous, throats 4.7–5.5 mm long, basally hispidulous, distally scabrellous or glabrous, lobes deltate to lance-triangular, 0.7–1.5 mm long, abaxially hispidulous, adaxially papillate; filaments papillate; style branches 2.5–3 mm long, slightly hispidulous, penicillate-dilated; cypselae blackish to buffy gray, 3.5–5 mm long, sparsely antrorsely hairy; pappi erose to laciniate coronas of mostly connate squamellae 0.5–1 mm high plus 0–2 subulate-aristate squamellae 2–5 mm long; $2n = 34$; flowering mostly Aug–Nov.

Open places, often along streams, Pine-Oak Forest; locally common on Central Plateau; 1750–2200 m. Widely scattered in Mex. (Chih., Coah., Dgo., S.L.P., Nay., Jal., Aguasc., Hgo., Cma., Mich., Tlax., Pue., Ver., Gro., Oax., Chis.), Guat., Hond., Salv.; adventive in Argentina. CHIAPAS COLLECTIONS: *C&L 587* (CAS); *RMK 2859* (DS, TEX, UC); *L 1473* (DS); *L 2212* (DS); *L 2366* (DS); *L 2484* (DS); *SI 2113* (TEX); *T 2* (DS); *T 1066* (DS); *T 1238* (DS); *T 1499* (DS); *7345*; *12157*; *14457*; *14610*.

Some distinctive Chiapan tithonias from open or wooded slopes, sometimes on limestone, in Seasonal Evergreen and Tropical Deciduous forests of Central Depression, Sierra Madre, and Pacific Coastal Plain at 130–1000 m [e.g., *K. Landon 781* (LL); *C. A. Purpus 9125* (UC); *J. Soule 2397* (TEX) and *2405* (TEX); *D. E. Breedlove 13846*; *20562*, *36793*, *41501*, and *46490*] have been treated by Dr. J. C. La Duke (pers. comm.) as falling within his circumscription of *T. tubaeformis*. The cited plants differ from typical *T. tubaeformis* as indicated in my key and were collected from elevations lower than is typical for *T. tubaeformis*. I suggest that they may represent a species distinct from *T. tubaeformis*.

72. TRAGOCEROS

Tragoceros Kunth, Nov. gen. sp., ed. fol. 4:195. 1818 [1820]; ed. qto. 4:248. 1820. — *Zinnia* L. sect. *Tragoceros* (Kunth) Olorode & Torres, Brittonia 22:367. 1970, as sect. *Tragoceras*. — TYPE: *Tragoceros zinnoides* Kunth = *Tragoceros americanus* (Mill.) S. F. Blake.

Annuals, mostly less than 3 dm high; leaves opposite, short-petioled to subsessile, blades narrowly deltate to lance-linear or elliptic, bases subcordate to truncate or broadly cuneate, margins entire, faces sparsely to moderately pilose to hirsutulous, usually dotted with resin globules; heads scattered on terminal peduncles or sessile at ends of branches; involucre cylindro-campanulate to stoutly campanulate, mostly 4–8 mm high; phyllaries 8–16, strongly graduate and imbricate, ovate to oblong, membranous to scarious; receptacles convex to low-conical; paleae scarious, narrowly oblong to linear, infolding the disc florets; ray florets 5–7, pistillate, corollas white or yellow to orange, often drying greenish, coriaceous and marcescent, tubes very short or none, laminae lance-attenuate to suborbicular, strongly 2-nerved from shoulders of cypselae, minutely bifid to deeply incised; disc florets 5–30+, functionally staminate, corollas pale yellow, becoming orange to purplish distally, narrowly funnelform, tubes shorter than throats, lobes 4–5, equal to subequal, glabrous but for papillate to velutinous adaxial faces of lobes; anther appendages narrowly deltate to minutely apiculate; styles undivided or weakly bifid, astigmatic, minutely hispidulous distally; cypselae black with paler tuberculae and corky or callous margins, ob-compressed or -flattened, oval to elliptic in outline, 1-nerved on each face, margins reflexed to subrevolute; pappi none; $x = 11$.

Five or so species ranging from northwestern Mexico to southern Mexico and Central America; related to *Zinnia*. Members of *Tragoceros* have been forced to cross with members of *Zinnia*; Olorode and Torres (1970) transferred members of *Tragoceros* to *Zinnia* as a section.

REFERENCES: MCVAUGH, R. 1984. Flora Novo-Galiciana. Vol. 12. Compositae. ed. W. R. Anderson. Ann Arbor: Univ. Michigan; OLORODE, O. and A. M. TORRES. 1970. Artificial hybridization of the genera *Zinnia* (sect. *Mendezia*) and *Tragoceras* [sic] (Compositae-Zinninae [sic]). Brittonia 22:359–369; TORRES, A. M. 1963. Revision of *Tragoceras* [sic] (Compositae). Brittonia 15:290–302.

1. *Tragoceros americanus* (Mill.) S. F. Blake, Contr. U.S. Natl. Herb. 26:240. 1930.

— *Calendula americana* Mill., Gard. dict., ed. 8. no. 10. 1768. — *Zinnia americana* (Mill.) Olorode & Torres, Brittonia 22:368. 1970. — TYPE: Mexico, Veracruz, *W. Hous-toun s.n.* (BM).

Tragoceros zinnoides Kunth, Nov. gen. sp., ed. fol. 4:195, tab. 385. 1820 [1818]; ed. qto. 4:249. 1820. — *Zinnia zinnoides* (Kunth) Olorode & Torres, Brittonia 22:368. 1970. — TYPE: Mexico, Michoacán, between Atria and Mt. Jorullo ("inter Ario, Aguascaro et montem ignivovum Jorullo"), *A. von Humboldt and A. J. A. Bonpland s.n.* (P, microfiche!).

Tragoceros schiedeana Less., Linnaea 9:269. 1834, as *Tragoceras*. — *Zinnia schiediana* (Less.) Olorode & Torres, Brittonia 22:268. 1970. — TYPE: Mexico, Veracruz, Naolinco ("Malpays de Nanlingo"), 29 Sep, *C. J. W. Schiede* "220" (G; isotypes: MO, NY, both fide Torres 1963).

Zinnia bicuspidis DC., Prodr. 5:535. 1836. — TYPE: "Mexico," described from plate in Sessé and Mocino, Icon. fl. mex.

Tragoceros mocinianum A. Gray, Proc. Amer. Acad. Arts 21:388. 1886. — TYPE: Mexico, Chihuahua, "Hills at San Jose, south of Batopilas," Aug–Nov 1885, *E. Palmer* "67" (GH; isotypes: NY, US).

Melampodium anomalum M. E. Jones, Contr. W. Bot. 18:72. 1933. — TYPE: Mexico, Jalisco, Guadalajara, La Baranca, 17 Sep 1930, *M. E. Jones* 27727 (POM; isotype: UC!).

ILLUSTRATION: Fig. 55.

Annuals, 1–2(–3) dm high; leaves short-petioled to subsessile, blades narrowly lance-deltate to lance-linear, mostly 15–35(–55) mm long, 5–15+ mm wide, bases usually truncate to subcordate, faces moderately to sparsely pilose to hispidulous with very slender hairs 0.5–0.9+ mm long and dotted with resin globules; peduncles mostly (5–)10–35+ mm long; involucre stoutly to narrowly campanulate, 4–7+ mm high; phyllaries 8–15, greenish-stramineous to purplish, chartaceous to membranous or scarious, ovate to oblong, glabrous; paleae stramineous to bronze, scarious, linear, about equalling disc florets; ray florets 5, corollas white, drying greenish yellow, tubeless, laminae linear-attenuate, 2–5+ mm long, spreading to recurved, their apices bifid to deeply incised, often uncinatate; disc florets 5–12+, corollas yellow to orange or purplish distally, 2.4–2.8 mm long, tubes ca. 0.8 mm long, continuous with the throats, throats 1.5 mm long, lobes 4–5, lance-deltate, ca. 0.4 mm long, minutely papillate within; anthers ca. 0.5 mm long, apical appendages reduced to minute apiculations; cypselae narrowly elliptic in outline, 4–6 mm long, smooth or with tawny tuberculae on faces and rough, corky margins, minutely strigillose; pappi none; $2n = 22$; flowering Aug–Oct.

Wooded slopes, ravines, roadsides, etc., in Evergreen Seasonal and Tropical Deciduous forests; uncommon in Central Depression, in Sierra Madre, and on Pacific Coastal Plain; 250–1250 m. Western and southern Mex. (Son., Chih., Sin., Dgo., Nay., Jal., Cma., Mich., Méx., Ver., Gro., Oax., Chis.), Guat., Hond., Nic. CHIAPAS COLLECTIONS: *And* 13227 (UC); *Da* 9541 (LL); *EM* 4816 (LL); *Mo* 698 (UC); *EWN* 2947 (GH, US); *R&R&M* 844 (WIS-photocopy in TEX); *T* 2974 (DS); 13242; 20625; 26927; 36683; 37359-A; 40566; 46100; 52739.

Sonoran and Chihuahuan plants included here within *T. americanus* differ from Chiapan plants in having

generally larger heads, longer ray corollas, and larger cypselae. Such plants have been distinguished as *Tragoceros zinniioides*, e.g., by McVaugh (1984). Plants from

intermediate localities tend to be morphologically intermediate; I have treated the whole as a variable continuum.

73. TRIDAX

Tridax L., Sp. pl. 900. 1753. — TYPE: *Tridax procumbens* L.

[*Bartolina* Adans, Fam. pl. 2:124. 1763. = *Tridax* L. (fide ING).]

[*Balbisia* Willd., Sp. pl. 3:2214. 1803; nom. rej. vs. *Balbisia* Cav., nom. conserv. — TYPE: *Balbisia elongata* Willd. = *Tridax procumbens* L.]

[*Amellus* Ortega ex Willd., Sp. pl. 3:2214. 1803, pro syn. sub *Balbisia*.]

Sogalgina Cass., Bull. Soc. Philom. Paris 1818:31. 1818. — TYPE: *Sogalgina trilobata* (Cav.) Cass. = *Galinsoga trilobata* Cav. = *Tridax trilobata* (Cav.) Hemsl.

Galinsogea Kunth, Gen. sp. nov., ed. fol. 4:198, t. 386. 1820 [1818]; ed. qto. 4:252. 1820. = *Sogalgina* Cass. 1818 (fide ING).

Ptilostephium Kunth, Gen. sp. nov., ed. fol. 4:199. 1820 [1818]; ed. qto. 4:255. 1820. — LECTOTYPE: (Cassini, 1826, in F. Cuvier, Dict. sci. nat., ed. 2. 44:60–62): *Ptilostephium coronopifolium* Kunth = *Tridax coronopifolium* (Kunth) Hemsl.

Carphostephium Cass. in F. Cuvier, Dict. sci. nat., ed. 2. 44:62. 1826. — TYPE: *Carphostephium trifidum* (Kunth) Cass. = *Ptilostephium trifidum* Kunth = *Tridax coronopifolium* (Kunth) Hemsl.

Mandonia Wedd., Bull. Soc. Bot. France 11:50, t. 1. 1864. — TYPE: *Mandonia boliviensis* Wedd. = *Tridax boliviensis* (Wedd.) R. E. Fries.

Annuals, herbaceous to suffrutescent perennials (often flowering first year), or shrubs, often procumbent or sprawling, sometimes rhizomatous or rooting at nodes, stems mostly 1–4(–9) dm long; leaves mostly opposite, the distal rarely alternate, petiolate or sessile, blades often pinnately or palmately lobed or dissected, faces variously tomentose or piloso-hirsute, to scabrellous, sometimes glabrate; heads borne singly or in loose, cymiform associations of 3–5(–8+); peduncles mostly 5–20+ cm long; involucre campanulate to hemispheric or urceolate, mostly 5–8 mm high; phyllaries mostly 11–15+ in 2–3+ series, the outer green to purple, herbaceous, the inner purple to stramineous, more membranous to scarious; receptacles slightly convex to hemispheric or conic; paleae similar to inner phyllaries, narrower, somewhat navicular, often cuspidate, usually persistent; ray florets none or 3–8(–13), pistillate, corollas white, yellow, or purplish, tubes slender, hairy, laminae ovate to cuneate or orbicular, usually 3-lobed, sometimes with 2 adaxial lobules at tops of tubes; disc florets 20–50+, bisexual, fertile, corollas white to yellow or purplish, sometimes, in absence of ray florets, the peripheral 8–13 conspicuously enlarged and bilabiate, otherwise typically with stout tubes ca. 1/3 as long as the cylindric to narrowly funnelform throats, lobes 5, equal to unequal, ovate to lance-linear; style branches long, slender with short to long, subulate, hispidulous appendages; cypselae gray to blackish, obconical to obpyramidal, obscurely 3–5-angled, glabrous or sericeous to villous; pappi (sometimes reduced or absent in ray florets) of ca. 10, 20, or 40, ciliolate to plumose setae or squamellae; $x = 9, 10$.

Some 26+ species, all native to New World, most Mexican, one a weed widespread through tropics and subtropics of the world.

REFERENCE: POWELL, A. M. 1965. Taxonomy of *Tridax* (Compositae). *Brittonia* 17:47–96.

- a. Ray florets none; peripheral 8–13 florets with enlarged, bilabiate corollas 1. *T. coronopifolia*
- aa. Ray florets 2–8; disc florets all similar.
 - b. Heads borne singly; peduncles patently hirsute to retrorsely strigose 3. *T. procumbens*
 - bb. Heads borne singly or in cymiform associations of 3–5+; peduncles variously hairy, not retrorsely strigose.
 - c. Peduncles little, if at all, stipitate-glandular; involucre 5–8(–10) mm high; ray florets 5–8, corollas white or yellow 2. *T. platyphylla*
 - cc. Peduncles stipitate-glandular; involucre 9–12 mm high; ray florets 2–3, corollas purplish 4. *T. purpurea*

1. *Tridax coronopifolia* (Kunth) Hemsl. in F. Godman and O. Salvin, Biol. cent.-amer., Bot. 2:207. 1881.

— *Ptilostephium coronopifolium* Kunth, Nov. gen. sp., ed. fol. 4: 200, t. 387. 1820 [1818]; ed. qto. 4:255. 1820. — TYPE: Mexico, Valley of México, 1160 hex. [2088 m], A. von Humboldt and A. J. A. Bonpland s.n. (P).

Ptilostephium trifidum Kunth, Nov. gen. sp., ed. fol. 4:200, t. 388. 1820 [1818]; ed. qto. 4:255. 1820. — *Carphostephium trifidum* (Kunth) Cass. in F. Cuvier, Dict. sci.

nat., ed. 2. 44:62. 1826. — *Tridax trifida* (Kunth) A. Gray, Proc. Amer. Acad. Arts 15:39. 1880 [1879]. — TYPE: Mexico, between Guanajuato and Valley of México, 900 hex. [1620 m], Sep. A. von Humboldt and A. J. A. Bonpland 4302 (P, microfiche!).

Tridax trifida (Kunth) A. Gray var. *alboradiata* A. Gray, Proc. Amer. Acad. Arts 15:39. 1880 [1879]. — *Tridax coronopifolia* (Kunth) Hemsl. var. *alboradiata* (A. Gray) B. L. Rob. & Greenm., Proc. Amer. Acad. Arts 32:9. 1896. — TYPE: Mexico, San Luis Potosí, 6000–8000 ft. [1829–

2440 m], Jul–Aug 1878, C. C. Parry and E. Palmer “511” (GH; isotypes: F, K, MO, NY, US).

Tridax lanceolata Klatt, Leopoldina 23:145. 1887. — LECTO-TYPE: (Powell 1965:87): Mexico, Puebla, Tehuacán, F. M. Liebmann “205” (C, photograph: GH).

Tridax macropoda Gand., Bull. Soc. Bot. France 65:47. 1918.

— TYPE: Mexico, México, near Tacubaya, 7500 ft. [2296 m], C. G. Pringle 7969 (?P; isotypes: F, MO).

ILLUSTRATION: Brittonia 17:90. 1965.

Perennials, often flowering first year, sometimes rhizomatous, sometimes suffrutescent, erect to sprawling, stems 1–2(–4) dm long; leaves often somewhat crowded at bases of stems, blades variously linear to oblanceolate, margins entire or toothed to pinnatifid or palmatifid with linear to cuneate or oblanceolate lobes, overall mostly 1–6 cm long, basal margins and both faces sparsely to densely piloso-hirsute; heads borne singly on slender, antrorsely piloso-hirsute, often glabrate peduncles 5–12(–22) cm long; involucre broadly campanulate to hemispheric, 5–7 mm high; phyllaries mostly 11–15, the outer green or purple, lance-linear to ovate or oblong, usually piloso-hirsute, the inner purple to stramineous, more scarious-membranous, oblong to obovate; receptacles hemispheric; paleae purple to stramineous, scarious, linear-oblong to oblanceolate, 6–7 mm long, apically rounded-obtuse, weakly, if at all, cuspidate; ray florets none, peripheral 8–13 “disc” florets conspicuously enlarged with whitish or pale to bright yellow, bilabiate corollas with the 3 outer lobes ovate to lance-linear, 1–5 mm long, patent or reflexed and the inner 2 lobes much shorter and nearly erect, the proper disc florets 30–60+, corollas yellow, tubes 0.7–1 mm long, throats stoutly cylindric, 2.5–3.5 mm long, lobes ovate to lance-deltate, 0.5–1.3 mm long; style branches ca. 1.5 mm long, stigmatic almost to tips; cypselae 2–3 mm long, sericeous to villous; pappi of ca. 20, unequal, lanceolate to lance-linear, ciliolate or plumose, squamellae 1.5–4.5 mm long; $2n = 18, 36, 54$.

On sandstone bluffs in Seasonal Evergreen Forest; one collection from Central Depression; 900 m. Southern and eastern Mex. (N. L., Tam., Zac., S.L.P., Jal., Gto., Qro., Hgo., Mich., Mex., D.F., Mlos., Tlax., Pue., Ver., Gro., Oax., Chis.). CHIA-PAS COLLECTION: 25260.

2. *Tridax platyphylla* B. L. Rob., Proc. Amer. Acad. Arts 43:41. 1907.

— TYPE: Mexico, Guerrero, Balsas Station, 600 m, 27 Sep 1905, C. G. Pringle 10075 (GH; isotypes: F, LL, MICH, MO, NY, SMU, UC, US).

Tridax scabrida Brandege, Univ. Calif. Publ. Bot. 6:73. 1914.

— TYPE: Mexico, Oaxaca, Picacho–San Gerónimo, Oct 1913, C. A. Purpus 6801 (UCI; isotypes: GH, MO).

ILLUSTRATION: none found.

Annuals (persisting?), sprawling to erect, stems 2–4(–8) dm long, usually sparsely antrorsely hispidulous, sometimes glabrate; petioles 2–15 mm long, narrowly winged, ciliolate, leaf blades lance-elliptic to lance-ovate or ovate, 3–8(–15) cm long, 1–4(–10) cm wide, bases cuneate, margins subentire to remotely serrate, apices acute, abaxial faces sparsely piloso-hirsutulous, adaxial faces sparsely scabrellous; heads borne singly or in loose cymiform associations of 3–5+; peduncles 2–5(–11) cm long, antrorsely or patently piloso-hirsute, sometimes also

stipitate-glandular; involucre cylindric-campanulate to hemispheric, 5–8(–10) mm high; phyllaries 11–13+, the outer green to purple, subrotund to lance-linear, piloso-hispidulous, sometimes stipitate-glandular, attenuate, the inner stramineous to purplish, lanceolate to lance-linear; receptacles hemispheric; paleae scarious, basally translucent, distally stramineous to purplish, lance-linear, gradually attenuate, 5–7(–9) mm long; ray florets 5–8, corollas whitish to pale yellow, tubes 3–4.5 mm long, pilosulous, laminae oblong to suborbicular, 5–7 mm long, 3-lobed; disc florets 30–50+, corollas pale yellow, tubes 1.5–2 mm long, distally sparsely hairy, throats narrowly cylindric, 3–4 mm long, proximally sparsely hairy, lobes lance-linear, 1.5–2 mm long, minutely hispidulous; style branches ca. 2 mm long, attenuate; cypselae 2–3 mm long, piloso-sericeous; pappi of ca. 20, unequal, ciliolate or subplumose setae 3–6.5 mm long; $2n = 18$.

Openings in Tropical Deciduous Forest; rare(?) on lower Pacific Coastal Plain or in adjacent Sierra Madre; ca. 850 m. Southern Mex. (Mich., Méx., Gro., Oax., Chis.), Nic. CHIA-PAS COLLECTIONS: P 6441 (F, GH, MO, NY, UC, US); 28266.

3. *Tridax procumbens* L., Sp. pl. 900. 1753.

— *Chrysanthemum procumbens* (L.) Sessé & Moc., Fl. mex., ed. 2. 190. 1894 [1896]. — TYPE: Mexico, Veracruz, W. Houstoun s.n. (BM)

Balbisia [nom. rej.] *elongata* Willd., Sp. pl. 3:2214. 1803. — *Amellus pedunculatus* Ortega ex Willd., Sp. pl. 3:2214. 1803, pro syn. — *Balbisia pedunculata* Hoffmanns., Verz. Pfl.-Hult. 228. 1824 [illegit. substitute]. — TYPE: Mexico, “Habitat in Mexico,” (no specimen seen).

Balbisia canescens Pers., Syn. pl. 2:470. 1807. — *Tridax procumbens* L. var. *canescens* (Pers.) DC., Prodr. 5:679. 1836. — TYPE: Colombia, Santa Marta, L. C. M. Richard s.n. (P).

Balbisia divaricata Cass., Ann. Sci. Nat. (Paris) 23: 90. 1831 [1829?]. — TYPE: Mauritius, grown in garden “des Pamplémousses,” Bouton s.n. (P).

Tridax procumbens L. var. *ovatifolia* B. L. Rob. & Greenm., Proc. Amer. Acad. Arts 32:7. 1896. — TYPE: Mexico, Oaxaca, vicinity of Yalalag, Jul 1894, E. W. Nelson 948 (GH; isotype: US).

ILLUSTRATION: Fig. 56.

Perennials, often flowering first year, stems procumbent to nearly erect, mostly 1–3(–4) dm long, usually hirsute, often rooting at nodes; petioles 1–10(–30) mm long, leaf blades lanceolate to lance-ovate or deltate, often trilobed, 1–5(–12) cm long, 5–20(–60) mm wide, bases cuneate, margins coarsely dentate to subentire, apices obtuse to acute, abaxial faces strigillose to hirsute, adaxial faces strigillose to scabrellous; heads mostly borne singly; peduncles ascending to erect, very slender, 8–12(5–20+) cm long, retrorsely strigose to patently hirsute; involucre cylindric-campanulate to hemispheric, 5–8 mm high; phyllaries 12–15, the outer green to purple, lanceolate to ovate or obovate and abruptly attenuate, piloso-hispid, the inner, stramineous to purplish, more membranous, lance-ovate, wholly or partly glabrous; receptacles convex to low-conic; paleae similar to inner phyllaries, lance-linear, 6–7(–9) mm long, often with abruptly cuspidate tips; ray florets 3–5(–8), corollas ochroleucous to pale yellow, tubes very slender,

2.5–4+ mm long, hirsutulous, laminae quadrate-ovate, 3.5–5 mm long, (2–)3-lobed; disc florets 40–80, corollas ochroleucous to yellow, tubes 0.5–1 mm long, throats narrowly cylindrical, 3.5–4.5 mm long, lobes lance-deltate, often unequal, 0.8–1.5 mm long; style branches 1–1.5 mm long, attenuate; cypselae 2–2.5 mm long, piloso-sericeous; pappi of ca. 20, plumose setae 4–5(–7.5) mm long; $2n = 36$; flowering \pm year round.

Ruderal or in openings in Evergreen Seasonal, Tropical Deciduous, and Pine-Oak forests and in Coastal Strand; uncommon in Central Depression and on Pacific Coastal Plain, rare in Northern Highlands, on Central Plateau, and in Sierra Madre; 3–1400 m. Virtually cosmopolitan throughout lowland tropics and subtropics of the world; Mex. (Son., Coah., N.L., Tam., Sin., S.L.P., Nay., Jal., Hgo., Mich., Ver., Gro., Oax., Camp., Yuc., Q. Roo, Chis.), Guat. Bel., Hond., Salv., Nic., C.R., Pan., Antill.; S.A. (Col., Ven., Guy., Per., Bol.); Old World. CHIAPAS COLLECTIONS: *Br* 187 (TEX); *Brooks* 55-7 (TEX); *C* 108 (DS); *C* 137 (DS); *Dan* 5030 (CAS); *Da* 29575 (UC); *Dunn* 21960 (TEX); *Jks* 7127 (TEX); *RMK* 2758 (DS, UC); *RMK* 2983 (DS, UC); *RMK* 3039 (DS, UC); *RMK* 3104 (UC); *RMK* 3122 (DS, UC); *RMK* 3443 (DS, UC); *L* 250 (DS); *L* 907 (DS); *Mz* 11041 (TEX); *Mz* 19111 (CAS); *Neff* 93-4-9-5 (TEX); *Neff* 93-4-17-4 (TEX); *RJ* 1834 (TEX); *SI* 2276B (TEX); *SI* 3081 (TEX); *Spo* 2797 (TEX, UC); *Sund* 2399 (TEX); *TW* 2319 (TEX); 6315; 7674; 19813; 20879; 23800; 24439; 36787.

4. *Tridax purpurea* S. F. Blake, Brittonia 2:351. 1937.

— TYPE: Guatemala, Huehuetenango, Huehuetenango, 2010 m, 10 Nov 1934, *A. F. Skutch* 1632 (GH).

ILLUSTRATION: none found.

Decumbent to ascending, perennial, stems sparsely antrorsely hispidulous, 3–9 dm long; petioles 5–10 mm long, narrowly winged, ciliolate-hispidulous, leaf blades weakly rhombic to lanceolate, 3–6 cm long, 15–25 mm wide, bases cuneate, margins remotely serrate, apices acute, faces sparsely piloso-scabrellous; heads borne singly or in loose, open, cymiform associations of 3–5+; peduncles 6–12(1–17) cm long, piloso-hirsute and stipitate-glandular; involucre cylindrical-campanulate, 9–12 mm high; phyllaries 12–16+, the outer greenish to stramineous, oval to oblong, the inner stramineous to purplish, linear-oblong; receptacles ovoid; paleae stramineous, scarious, lance-ovate, (5–)9–10 mm long, attenuate to mucronate; ray florets 2–3, corollas purplish, tubes 5–7.5 mm long, pilosulous, laminae obovate to cuneate, 10–15 mm long, 3-lobed; disc florets 20–40, corollas greenish yellow, tubes ca. 2 mm long, densely pilosulous, throats cylindrical, ca. 5 mm long, pilosulous at their bases, lobes lance-deltate, ca. 1 mm long; style branches ca. 1.5 mm long, attenuate; cypselae 3–3.5 mm long, piloso-sericeous, carpopodia conspicuously developed; pappi of 10–20, unequal, linear-subulate, fimbriate or ciliolate squamellae 1–2 mm long.

Steep slopes in Pine-Oak Forest; rare in eastern Sierra Madre; ca. 1700 m. Southern Mex. (Chis.), Guat. CHIAPAS COLLECTION: 65645.

74. TRIGONOSPERMUM

Trigonospermum Less., Syn. gen. Compos. 214. 1832. — TYPE: *Trigonospermum adenostemmoides* Less.

Annuals or perennials, sometimes suffrutices, 1(–4) m high; leaves opposite, winged-petiolate to sessile, blades rounded-trullate to subdeltate, lance-ovate, or lance-elliptic, triplinerved from near their bases, margins serrate to remotely toothed, faces sparsely scabrellous to densely substrigose, especially the abaxial, often resinous-gland-dotted; heads 10–100+ in loose, cymiform or paniculiform associations; peduncles very slender, often crozier-like, minutely and densely stipitate-glandular; involucre obconic to hemispheric, less than 5 mm high; phyllaries biseriate, the outer 5 lance-linear to narrowly elliptic, erect, hispidulous and ciliolate with multicellular, pointed hairs and, often, subsessile capitate-glandular hairs, the inner 5–10 phyllaries similar but broader, cucullate, and less hairy, infolding ovaries of the subtended florets; receptacles convex, tiny; paleae scarious, the outermost obovate, the inner linear-filiform; ray florets 4–10, pistillate, corollas pale yellow to whitish, tubes very short, glabrous or pubescent, laminae flabellate, deeply 3-toothed or -lobed, abaxially sparsely to densely hairy with long, multicelled, pointed and subsessile, capitate-glandular hairs; disc florets 8–20(–50+), functionally staminate, corollas yellow to orange, tubes less than half as long as the gradually ampliate, cylindro-funnelform throats, lobes (4–)5, narrowly to broadly deltate, hair kind and distribution as with rays; styles undivided to weakly bifid, astigmatic, distally papillate to hispidulous; cypselae black, ellipsoidal to obpyramidal, often 3-angled, striate, glabrous; pappi none; $x = 15$.

Four or five species, all Mexican (mostly western and southern) with one also in Guatemala; very closely related to, perhaps congeneric with, *Sigesbeckia*.

REFERENCES: MCVAUGH, R. and C. W. LASKOWSKI. 1972. The genus *Trigonospermum* Less. (Compositae, Heliantheae). Contr. Univ. Michigan Herb. 9:495–506; TURNER, B. L. 1978. New species and combinations in the genera *Sigesbeckia* and *Trigonospermum* (Compositae: Melampodiinae). Brittonia 30:64–68.

1. *Trigonospermum adenostemmoides* Less., Syn. gen. Compos. 214. 1832.

— TYPE: Mexico, probably Veracruz, sent to Lessing by Schiede, see discussion by McVaugh and Laskowski 1972.

ILLUSTRATION: Contr. Univ. Michigan Herb. 9:503. 1972.

Herbs, probably annual, to 8(–20?) dm high; petioles winged at least distally, 1–3+ cm long, to 1 cm wide, leaf blades broadly rounded-trullate to lance-ovate, 8–12(–16) cm long, 6–8(–14)

cm wide, margins remotely serrate, abaxial faces sparsely scabrellous and resinous-gland-dotted, adaxial faces more scabrous, less resinous-gland-dotted; heads loosely aggregated in corymbiform clusters; peduncles 1–3 cm long, densely and minutely stipitate-glandular; involucre obconic to hemispheric, 2+ mm high; outer phyllaries lance-linear, sparsely hispidulous-strigillose with multicelled, pointed hairs, inner phyllaries similar but broader; outer paleae scarious, cuneate-flabelliform, erose distally, inner paleae similar but linear to filiform; ray florets 3–5, corollas ochroleucous (to yellow?), tubes glabrous, 0.2–0.3 mm long, laminae flabelliform, 3-toothed or -lobed, 1–3+ mm long, abaxially sparsely hairy with

multicelled-pointed and capitate-glandular hairs; disc florets ca. 10, corollas pale yellow, tubes 0.2–0.3 mm long, glabrous, throats abruptly ampliate, cylindric, ca. 0.7 mm long, lobes (4–)5, rounded-deltate, ca. 0.5 mm long; styles undivided, the distal 0.4 mm papillate; cypselae obpyramidal, 3-angled, 1.5–2.4 mm long, glabrous, striate; pappi none; flowering Jan.

In Tropical Deciduous Forest; rare at east end of Central Depression and in adjacent SE Sierra Madre; 700–1700 m. Southern Mex. (Ver., from environs of Jalapa and Orizaba, Chis.). CHIAPAS COLLECTIONS: *SI 3093* (TEX); *28633*; *46313*; *65660*; *69926*.

75. VERBESINA

Verbesina L., Sp. pl. 901. 1753. — LECTOTYPE: (M. L. Green, Prop. Brit. Bot. 183. 1929): *Verbesina alata* L.

Ximenesia Cav., Icon. 2:60, t. 178. 1793–1794. — TYPE: *Ximenesia encelioides* Cav. ("enceliodes") = *Verbesina encelioides* (Cav.) A. Gray.

Actinomeris Nutt., Gen. 2:181. 1818, nom. conserv. — TYPE: *Actinomeris squarrosa* Nutt., nom. illegit. = *Coreopsis alternifolia* L. = *Actinomeris alternifolia* (L.) DC., type conserv. = *Verbesina alternifolia* (L.) Britton ex Kearney.

Trees (to 25+ m high), shrubs, suffrutices, perennial herbs, and, exceptionally, annuals; some species have winged stems; leaves opposite or alternate, petiolate or sessile, petioles often winged by decurrent blade bases, blades of various shapes, usually pinnatinerved, exceptionally triplinerved from near their bases, commonly large (15–40+ cm long) and coriaceous, margins entire or serrate to pinnatilobed or, rarely, palmatilobed, faces usually scabrous to scabrellous; heads usually 20–350+ in cymiform clusters or corymbiform to paniculiform associations, sometimes borne singly; peduncles commonly stout and hairy; involucre mostly campanulate to hemispheric, mostly 2–7(–20) mm high or diam. at anthesis; phyllaries 9–21(–50+) in 2–5+ series, usually strongly graduate, variously herbaceous to membranous or scarious and linear-lanceolate to oblong, ovate, or broader; receptacles slightly convex to conical; paleae usually scarious, narrow, navicular, each ± infolding the subtended floret, often carinate; ray florets 0–13(–50+), typically pistillate and fertile, sometimes neuter or styliiferous and sterile, corollas white to ochroleucous or yellow to orange or reddish, tubes commonly pilose, laminae linear to oblong or ovate, inconspicuous to showy; disc florets 20–30(–300+), bisexual, fertile, corollas mostly concolorous with rays, tubes much shorter than to about equalling the narrowly funnelform to abruptly campanulate throats, tubes and throats often puberulent, lobes 5, deltate to lance-linear, glabrous or hairy; style branches slender to stout, apically acute to attenuate; cypselas bodies dark brown to blackish or slatey gray, usually compressed or flattened, exceptionally triquetrous (rays), cuneate to oblanceolate or obovate in outline, the faces glabrous or tuberculate and/or hairy, the margins typically with translucent or white to stramineous wings subtending, and often running ± symmetrically onto the awns; pappi of 2(1–3), erect to divergent, straight to uncinuate, usually persistent, rarely falling, subequal to unequal awns or subulate scales without interposed squamellae; $x = 17$ (?16, 18).

An American genus of perhaps 200 or more species, ranging from southeastern Canada and eastern and southern United States through Mexico, Central America, and Antilles to Paraguay, Argentina, and Chile. Most species (perhaps 60%) are found in Mexico and Central America.

REFERENCES: McVAUGH, R., 1980. Botanical results of the Sessé & Mociño expedition (1787–1803). II. The *Icones Florae Mexicanae*. Contr. Univ. Michigan Herb 14:99–140; OLSEN, J., 1985. Synopsis of *Verbesina* sect. *Ochractinia* (Asteraceae). Pl. Syst. Evol. 149:47–63; TURNER, B. L., 1985. Revision of *Verbesina* sect. *Pseudomontanoa* (Asteraceae). Pl. Syst. Evol. 150:237–262.

- a. Leaves all, or mostly opposite.
 - b. Leaf blades whitened abaxially with fine, appressed hairs. 11. *V. hypoglauca*
 - bb. Leaf blades green abaxially, variously hairy, not whitened.
 - c. Phyllaries 30+; disc florets ca. 120–150+, mostly longer than the paleae, corollas orange to nearly scarlet. 5. *V. crocata*
 - cc. Phyllaries mostly 7–21(–27); disc florets 4–55, mostly shorter than the paleae, corollas pale to bright yellow.
 - d. Involucres hemispheric to campanulate, 8–15+ mm high; phyllaries 18–27.
 - e. Stems winged; outer phyllaries oblanceolate to spatulate, ± equalling the inner; pappus awns ca. 4 mm long. 6. *V. cronquistii*
 - ee. Stems not winged; outer phyllaries orbiculate to ovate, usually shorter than the inner; pappus awns 0.3–0.5 mm long. 23. *V. strotheri*

- dd. Involucres obconic to cylindric-turbinate or campanulate, mostly 3–6 mm high; phyllaries 8–13(–20).
- f. Ray florets 5–8(–21), fertile; disc florets 12–20(–50), corollas 4–5 mm long. 7. *V. fastigiata*
- ff. Ray florets none or 1–3, neuter; disc florets 4–15, corollas 5–6.5 mm long.
- g. Stems \pm quadrangular, usually winged; disc florets mostly 12–15 3. *V. breedlovei*
- gg. Stems terete, not winged; disc florets 4–9(–11) 16. *V. oligantha*
- aa. Leaves all or mostly alternate.
- h. Corollas white to greenish or ochroleucous.
- i. Young stems copiously appressed-pubescent to pilose or tomentose, often with sordid hairs.
- j. Leaves mostly membranous, sparsely pilosulous, usually glabrate; cypselae 3.5–5 mm long 13. *V. lanata*
- jj. Leaves membranous to coriaceous, densely pilose to strigose; cypselae 2–3 mm long.
- k. Stems usually winged, sometimes not; leaf blades usually sinuately to pinnately lobed, sometimes toothed or serrate; heads usually 150–300 per capitulescence; ray florets mostly 8(–12) 24. *V. turbacensis*
- kk. Stems winged; leaf blades subtire to denticulate, not pinnately lobed; heads usually 30–60 per capitulescence; ray florets mostly (8–)13–15 19. *V. petzalensis*
- ii. Young stems glabrous or sparsely puberulent with whitish hairs, then often glabrate.
- l. Leaf blades not sinuately to pinnately lobed.
- m. Leaves sessile, blades narrowly lanceolate to oblanceolate, 12–18+ cm long, 3–4+ cm wide; involucres 6–8 mm high; disc florets 15–30. 9. *V. guatemalensis*
- mm. Leaves petiolate, blades lance-ovate to ovate, 12–20(–40) cm long, 5–12(–20) cm wide; involucres 4–6 mm high; disc florets 50–75. 21. *V. punctata*
- ll. Leaf blades sinuately to pinnately lobed.
- n. Petioles not winged or basally auriculate; cypselae ca. 3.5 mm long 14. *V. myriocephala*
- nn. Petioles winged, usually basally auriculate; cypselae 4–6 mm long.
- o. Stems winged; phyllaries 18–22; paleae ca. 4.5 mm long 12. *V. hypsela*
- oo. Stems not winged; phyllaries 13–16; paleae 5–8 mm long 8. *V. gigantea*
- hh. Corollas yellow to orange, sometimes drying to reddish brown.
- p. Ray florets 30–50; disc florets 200–300 22. *V. sousae*
- pp. Ray florets none or mostly 5, 8, 13, 21; disc florets 4–100+.
- q. Leaf blades silvery or whitened abaxially with fine, appressed hairs (sometimes pale green in *V. neriifolia* with 1–12+ heads in loose, leafy clusters to 15 cm across).
- r. Ray florets 15–20, corolla laminae 12–20 mm long 15. *V. neriifolia*
- rr. Ray florets none or ca. 8, corolla laminae 2–5 mm long 10. *V. hypargyrea*
- qq. Leaf blades usually \pm green abaxially, variously hairy, sometimes tomentose.
- s. Heads 12–30(8–50) in open corymbiform or paniculiform associations 7–20 cm across; involucres hemispheric to saucer-shaped, 5–12 mm diam. at anthesis.
- t. Ray florets 12–15, corolla laminae 5–8 mm long; cypselae ca. 1.5 mm long. 4. *V. chiapensis*
- tt. Ray florets 13–21, corolla laminae 4–5 mm long; cypselae 3–3.5 mm long. 17. *V. persicifolia*
- ss. Heads (15–)50–100+ in congested, corymbiform or paniculiform masses 6–20 cm across; involucres campanulate to cylindric or turbinate, 3–5(–7) mm diam. at anthesis.
- u. Mature paleae 6–12 mm long; ray florets neuter; cypselae 3.5–6 mm long. 2. *V. apleura*
- v. Ray florets 8–12 20. *V. pleistocephala*
- vv. Ray florets 5–6
- uu. Mature paleae 3–4.5 mm long; ray florets pistillate; cypselae 1.5–2.5 mm long.
- w. Leaf blades lanceolate to oblanceolate, lengths mostly 4–5 times widths; inner phyllaries rounded to truncate apically. 18. *V. perymenioides*
- ww. Leaf blades rhombic to broadly oblanceolate, lengths mostly 2–3 times widths; inner phyllaries apically attenuate to apiculate 1. *V. agricolarum*

1. *Verbesina agricolarum* Standl. & Steyererm., Publ. Field Mus. Nat. Hist., Bot. Ser. 22:319. 1940.

— TYPE: Guatemala, Chimaltenango, Finca La Alameda, 21 Sep 1937, *J. P. Johnston 1026* (F!).

ILLUSTRATION: none found.

Shrubs, to 3 m high; stems not winged; leaves alternate, petioles mostly 8–25 mm long, blades rhombic to oblanceolate, pinnatinerved, 7–12+ cm long, 3–5(–8+) cm wide, lengths mostly 2–3 times widths, bases cuneate, decurrent onto petioles, margins serrate to subtire, apices acute, abaxial faces green, sparsely piloso-strigillose, sometimes glabrescent, adaxial faces scabrous; heads 50–100+ in rounded to flat-topped corymbiform associations 12–20 cm across; peduncles 5–12 mm long, pilose to subtomentose; involucres cylindric-campanu-

late, 3–5 mm high; phyllaries 12–16, greenish to stramineous, graduate, the outer shorter, linear-oblong, distally herbaceous, obtuse, the inner more membranous, attenuate to apiculate, all puberulent or ciliate; receptacles convex; paleae stramineous, navicular, ca. 4.5 mm long, attenuate to apiculate, similar to inner phyllaries; ray florets 8–12, fertile, corollas pale yellow, tubes ca. 1.3 mm long, sparsely pilose, laminae oblong, ca. 3.5 mm long; disc florets ca. 15–35, corollas yellow, tubes ca. 0.5 mm long, sparsely pilose, throats narrowly funnelliform, slightly ampliate, ca. 2.5 mm long, sparsely pilose, lobes deltate-ovate, ca. 0.5 mm long; style branches ca. 1 mm long, hispidulous; cypsela bodies blackish brown, narrowly cuneate, ca. 2.5 mm long, 0.8 mm wide, glabrous or sparsely strigillose, wings wanting and margins ciliate (reputedly sometimes with well-developed wings); pappi of 2 stout to slender awns ca. 1.5+ mm long.

Steep slopes in Evergreen Seasonal Forest; apparently rare in Central Depression; 1350 m. Southern Mex. (Oax., Chis.), Guat., Hond., Nic. CHIAPAS COLLECTION: 29108.

2. *Verbesina apleura* S. F. Blake, Contr. Gray Herb. 52:53. 1917.

— TYPE: Guatemala, Quezaltenango, 17 Jan 1917, E. W. D. Holway 739 (GH).

ILLUSTRATION: none found.

Shrubs, sometimes subscandent, or trees, to 5(–10) m high; stems not winged; leaves alternate, petioles 1–3+ cm long, sometimes narrowly winged, blades broadly to narrowly lanceolate to lance-elliptic, pinnatinerved, 8–15(–20+) cm long, 3–5(–8+) cm wide, bases broadly to narrowly cuneate, margins subentire to coarsely serrate, often callous-denticulate, apices acute to acuminate, abaxial faces subtomentose to pilose, strigillose, or subglabrous, adaxial faces green, usually scabrous, sometimes glabrescent; heads 30–60+ in corymbiform clusters 8–20 cm across, terminal and in distal axils; peduncles slender to stout, 3–15(–30) mm long, strigillose to subtomentose; involucre cylindric-campanulate, 5–9 mm high; phyllaries mostly 12–15, dark green to purplish, strongly graduate, the outer shorter, all lance-deltate to lance-linear or oblong, acute to obtuse or rounded-truncate, strigillose, often ciliate; receptacles convex; paleae stramineous or darker, strongly navicular, 6–8 mm long, apically rounded to obtuse, sometimes obscurely cuspidate, similar to inner phyllaries; ray florets 8–12, neuter, corollas yellow, often fading, tubes 1–1.5 mm long, pilose, laminae ovate to oblong, 3–10 mm long; disc florets mostly 20–30+, corollas yellow, tubes 1–1.5 mm long, pilose, throats narrowly funnelliform, 2–3 mm long, lobes subequal, lance-triangular, ca. 1 mm long; style branches ca. 1.5 mm long, attenuate, hispidulous; cypsela bodies blackish to brown, narrowly cuneate, 4–6 mm long, 1.2–1.6 mm wide, glabrous or sparsely hispidulous to pilose, wings translucent to shiny-stramineous, 0.5–1.4 mm wide, ciliate or glabrous; pappi of 2 stout, scabrelous, sometimes deciduous, awns 2–4 mm long.

Wooded and shrubby slopes in Montane Rain, Evergreen Cloud, Pine-Oak-*Liquidambar*, and Pine-Oak forests; common on Central Plateau, uncommon in Northern Highlands, Eastern Highlands, and Central Depression, common in Sierra Madre; 1200–2900 m. Southern Mex. (Chis.), Guat. CHIAPAS COLLECTIONS: *Cro* 47418 (MO, UC); *Cro* 65228 (TEX, UC); *Gar* 268 (TEX); *GL* 292 (TEX); *GS* 40 (CAS); *GE* 653 (TEX); *GE* 990 (TEX); *He* 437 (TEX); *Kim* 10028 (TEX); *Kim* 10043

(TEX); *L* 446 (DS); *L* 480 (DS, LL); *L* 525 (DS); *Luc* 2586 (TEX); *M* 1148 (CAS); *EM* 5100 (CAS, LL); *RM* 634 (CAS); *RM* 635 (CAS); *R&B* 19808 (DS); *R&B* 19862 (DS); *SR* 648 (TEX); *T* 500 (DS, LL); *T* 529 (DS, LL); *T* 616 (DS, LL); *T* 678 (DS); *T* 1948 (DS); *T* 1959 (DS); *T* 2000 (DS); *T* 2102 (DS, LL); *T* 3915 (DS); *T* 9517 (TEX); *T* 9559 (TEX); *T* 9646 (CAS, TEX); *Z* 764 (DS); 8184; 8876; 9371; 9521; 24152; 31105; 31849; 32412; 33500; 33629; 39597; 40758; 41598; 49820; 49932; 50009; 50042; 50079; 50284; 50945; 55739; 57041; 58152; 58200; 58269; 58501; 67198.

3. *Verbesina breedlovei* B. L. Turner, Pl. Syst. Evol. 150:244. 1985.

— TYPE: Mexico, Chiapas, ca. 15 km WNW of Ocozacoatlán, at limestone sink called La Cima, 15 Oct 1972, D. E. Breedlove 29000 (LL!; isotypes: DS!, ENCB, MO, TEX).

ILLUSTRATION: Pl. Syst. Evol. 150:243. 1985.

Shrubs or trees, 3–5(–7) m high; stems somewhat quadrangular distally, obscurely to prominently winged; leaves opposite, petioles mostly 3–10 cm long, moderately to narrowly winged, blades proper deltate to lance-ovate in gross outline, often 3-lobed with rounded sinuses, unequally pinnatinerved with more prominent laterals into lobes, 15–30 cm long, 10–18 cm wide, bases broadly cuneate and decurrent onto petioles, margins subentire or denticulate, apices mostly acute, abaxial faces green, closely scabrous, especially on the raised reticulum of veins, adaxial faces scabrous; heads 30–60+ in crowded, compound corymbiform masses 12–30 cm across; peduncles 3–12(–20) mm long, densely scabrelous with crisped hairs; involucre cylindric-turbinate, 4–6 mm high; phyllaries 9–12, greenish to stramineous, sparsely scabrelous, strongly graduate, the outer shorter, more linear, the inner lanceolate to lance-ovate; receptacles convex; paleae stramineous to orange-yellow, scarious, oblong, navicular, not carinate, 7–9 mm long, rounded to acute, sparsely scabrelous; ray florets none or 1–2(–3), neuter, corollas yellow to yellow-orange, tubes 2–3 mm long, sparsely puberulent, laminae oval-elliptic to rotund, 3–6 mm long; disc florets mostly 12–15, corollas yellow to yellow-orange, sparsely puberulent at bases of tubes, tubes ca. 1.5 mm long, throats very narrowly funnelliform, ca. 1.5 mm long, lobes lance-deltate to lance-linear, ca. 1.5–2 mm long; style branches stout, ca. 1.5 mm long, minutely hispidulous and penicillate distally; cypsela bodies blackish to slatey, narrowly obtrullate to oblanceolate, 6–8 mm long, sparsely strigosopilose, wings stramineous, 1–3 mm wide, often corky, ciliate; pappi of 2, slender, somewhat flattened, stramineous, erect to divergent, glabrous or minutely hispidulous, basally dilated, subequal awns 2–4 mm long; $2n = 34$; flowering Oct–Nov.

Wooded slopes, canyon walls, and open places in Evergreen Seasonal and Tropical Deciduous forests; uncommon in Central Depression, on adjacent Central Plateau, and in Sierra Madre; 700–1700 m. Scattered in southern Mex. (Mich., Gro., Chis.). CHIAPAS COLLECTIONS: *Cro* 9678 (TEX); *Cro* 10498 (DS, TEX); *Pa* 18 (CAS); *Pan* 2132 (TEX); *T* 3286 (DS, F); 13329; 13915; 20460; 29000; 44384; 46333; 46976; 47042; 47664; 55467; 70772.

4. *Verbesina chiapensis* B. L. Rob. & Greenm., Proc. Amer. Acad. Arts 34: 554. 1899.

— TYPE: Mexico, Chiapas, near Tumbala, 1200–1700 m, 20 Oct 1895, E. W. Nelson 3364 (syntypes: GH!, US).

ILLUSTRATION: none found.

Shrubs, to 3 m high; stems rarely winged, usually not winged in Chis.; leaves alternate, petioles 15–25 mm long, blades lanceolate, pinnatinerved, 12–24 cm long, 3–6 cm wide, bases narrowly cuneate, margins obscurely serrulate, apices attenuate, abaxial faces greenish, finely strigillose, adaxial faces glabrous; heads ca. 20–50 in open corymbiform or paniculiform associations 15–20 cm across; peduncles mostly 10–30 mm long, hispidulous; involucre hemispheric to saucer-shaped, ca. 5–7 mm diam., the heads becoming spherical in fruit; phyllaries ca. 12, greenish, herbaceous, oblanceolate to ovate, 3–5 mm long, subglabrous to sparsely puberulent, often squarrose to reflexed apically, acute; receptacles convex to hemispheric; paleae navicular, carinate, 3–4 mm long, proximally scarious, distally indurate, pungent; ray florets 12–15, fertile, corollas yellow, sometimes streaked with orange, tubes ca. 0.5 mm long, laminae linear-oblong, 5–8 mm long; disc florets ca. 50, corollas yellow-orange, drying to reddish brown, tubes ca. 0.7 mm long, pilose, apically constricted, throats narrowly cylindric, ca. 2.5 mm long, lobes deltate, erect, ca. 0.5 mm long; style branches ca. 1.5 mm long, attenuate, hispidulous; cypselas bodies blackish, rounded-cuneate to oblanceolate, ca. 1.5 mm long, sparsely appressed-puberulent, wings stramineous, to ca. 0.5 mm wide distally, much narrower proximally; pappi of 2 stout, slightly divergent awns ca. 1 mm long; flowering Oct–Nov.

Openings in Tropical Rain, Lower Montane Rain, and Tropical Deciduous forests; uncommon or rare on N Central Plateau and in Northern Highlands; 200–1700 m. Southern Mex. (Oax., Chis.). CHIAPAS COLLECTIONS: *Br* 428 (CAS); *Br* 541 (CAS); *Crq* 11216 (DS, LL); *GE* 1989 (CAS); *EWN* 3364 (type); *Pan* 2139 (TEX); *PM* 89 (CAS, TEX); *SC* 169 (CAS, TEX); *BLT* 15443 (TEX); *TW* 2325 (TEX); 29845; 46790; 46883; 46946.

5. *Verbesina crocata* (Cav.) Less. ex DC., Prodr. 5:617. 1836.

— *Bidens crocata* Cav., Icon. 1:66, t. 99. 1791. — *Spilanthes crocata* (Cav.) Sims, Bot. Mag. 39, t. 1627. 1814. — *Platypteris crocata* (Cav.) Kunth, Nov. gen. sp., ed. fol. 4:157. 1820 [1818]; ed. qto. 4: 201. 1820. — TYPE: "Habitat in Mexico. Vide floridam in dicto horto mense Februario et Martio"; no specimen seen; use of this name here is based on the illustration.

Verbesina ovatifolia A. Gray, Proc. Amer. Acad. Arts 19:15. 1883. — TYPE: Mexico, Chiapas, A. B. Ghiesbreght 523 (GH!).

Spilanthes heterophyllus Sessé & Moc., Pl. nov. Hisp. 130. 1889. — TYPE: Plate 155 in M. Sessé and J. M. Mocino, Icon. Fl. Mex. (cf. McVaugh 1980).

ILLUSTRATIONS: see synonymy.

Shrubs, often scandent, to 1(–3+) m high; stems quadrate, obscurely to prominently winged; leaves opposite, petioles

10–25 mm long, narrowly winged by decurrent blade bases, blades proper broadly lanceolate to ovate, the proximal often incised with rounded sinuses, pinnatinerved, 8–15+ cm long, 3–10+ cm wide, bases broadly to narrowly cuneate, apices acute to acuminate, abaxial faces green, scabrous to scabrelous, adaxial faces scabrous; heads 9–25+ in open, terminal, ovoid to pyramidal, corymbiform associations 12–30 cm across, proximal branches strikingly patent, at least at base; peduncles mostly 20–45 mm long, often curved, bracteolate, strigillose to hirtellous; involucre campanulate to hemispheric, 4–6+ mm high; phyllaries ca. 30+, strongly imbricate, the outer shorter, more herbaceous, all lance-acute, puberulent to strigillose; receptacles convex; paleae scarious, narrowly navicular, 6–7 mm long, carinate, distally indurate, pungent; ray florets none; disc florets ca. 120–150+, corollas yellow to orange or reddish, tubes ca. 1 mm long, hispid-pilose, apically constricted, throats very narrowly funnelform to cylindric, 5–6 mm long, sparsely hirtellous, lobes lance-linear, ca. 1 mm long, subglabrous; style branches ca. 2 mm long, subulate-appendaged; cypselas bodies grayish, narrowly obovate to rounded-obtrullate, 5–6 mm long, ca. 1.5 mm wide, glabrous, wings stramineous, shiny, 1.5–3.5 mm wide distally, minutely ciliolate; pappi of 2 subequal, slender, subglabrous, slightly divergent awns 2–3.5 mm long; flowering Nov–Dec.

Open shrubby slopes, often along streams, in Montane Rain, Evergreen Cloud, Evergreen Seasonal, and Tropical Deciduous forests; common in Central Depression, infrequent in Northern Highlands, on Central Plateau, in Sierra Madre, and on Pacific Coastal Plain; 488–1200(–2000) m. Southern Mex. (Nay., Jal., Mich., Méx., Mlos., Pue., Ver., Gro., Oax., Chis.), Guat., Nic., C.R. CHIAPAS COLLECTIONS: *G* 523 (GH); *L* 2700 (DS); *L* 2802 (DS); *Mz* 8581 (TEX, UC); *EM* 6131 (LL); *EM* 17179 (DS); *Pan* 2120 (TEX); *T* 3118 (DS, LL); *T* 3187 (DS); *T* 4520 (CAS); *T* 5025 (UC); *TW* 2377 (TEX); 13581; 23075; 23575; 41169; 42129; 42364; 42704; 47094; 47667; 48474; 48656; 48909; 54687.

6. *Verbesina cronquistii* B. L. Turner, Pl. Syst. Evol. 150:250. 1985.

— TYPE: Mexico, Chiapas, 21 miles [34 km] south of Comitán, 3500 ft. [1066 m], 3 Nov 1965, A. Cronquist and M. Sousa 10479 (TEX!; isotypes: DS!, F!, MEXU, NY, US!).

ILLUSTRATION: none found.

Shrubs, 1–2 m high; stems winged by decurrent petiole bases; leaves opposite, petioles 2–5+ cm long, wings 4–9 mm wide, blades proper deltate to deltate-ovate, obscurely triplinerved from near their bases, pinnatinerved beyond, 9–17 cm long, 6–9 cm wide, bases broadly cuneate to truncate, margins coarsely and irregularly dentate, apices acute, abaxial faces green, finely pilose, adaxial faces scabrelous; heads (12–)20–30+ in corymbiform associations 12–20 cm across; peduncles 2–15(–30) mm long, densely piloso-hispid; involucre broadly campanulate to hemispheric, 10–15 mm diam. at anthesis; phyllaries ca. 21, the outer herbaceous, the inner more scarious and stramineous, all narrowly oblanceolate to spatulate, subequal, 8–12 mm long, pilosulous, acute to acuminate or attenuate; receptacles flat; paleae stramineous, scarious, strongly carinate-navicular, 8–11 mm long, distally pilosulous, apically attenuate; ray florets 4–6, fertile, corollas yellow, tubes

ca. 2–2.5 mm long, pilose, laminae linear-oblong, ca. 10 mm long, 3 mm wide; disc florets 30–50, corollas yellow-orange, tubes 1.5 mm long, pilose, throats 4–4.5 mm long, abruptly dilated distal to the tubes, then cylindric, glabrous, lobes narrowly triangular, 1.1–1.4 mm long, glabrous; anthers dark, ca. 3.5 mm long including lanceolate appendages (0.5 mm) and sagittate bases (0.2 mm); style branches ca. 2 mm long, minutely hispidulous, distally attenuate; cypsela bodies dark brown, sinuately oblanceolate or cuneate in outline, basally attenuate, 6–7 mm long, to 2 mm wide, 1-nerved on each face, sparsely piloso-hispidulous, wings stramineous or translucent, ca. 1.5 mm wide, ciliolate; pappi of 2, slightly divergent, sparsely hispidulous awns ca. 4 mm long; $2n = 34$; flowering Oct–Nov.

Chiapas endemic: Shaded ravines in Evergreen Seasonal and Tropical Deciduous forests; uncommon in Central Depression; 750–1100 m. CHIAPAS COLLECTIONS: *Crq 10479* (type); 46985; 53668.

7. *Verbesina fastigiata* B. L. Rob. & Greenm., Proc. Amer. Acad. Arts 34: 558. 1899.

— TYPE: Mexico, between México and Morelia, Apr–May 1849, *J. Gregg s.n.* [575] (GH).

Verbesina pinnatifida Cav., Icon. 1:67, t. 100. 1791, not Sw. 1788. — *Verbesina greenmanii* Urban, Symb. antill. 5:265. 1907. — TYPE: Grown in Madrid from Mexican seed; the plate is diagnostic.

Verbesina grandis M. E. Jones, Contr. W. Bot. 15:154. 1929, not S. F. Blake 1924. — LECTOTYPE: (S. F. Blake, Contr. U.S. Natl. Herb. 29:132. 1945): Mexico, Nayarit, Tepic, 14 Feb 1927, *M. E. Jones 23420* (POM).

Verbesina ampla M. E. Jones, Contr. W. Bot. 18:75. 1933. — LECTOTYPE: (S. F. Blake, Contr. U.S. Natl. Herb. 29:132. 1945): Mexico, Jalisco, “La Barranca,” ca. 5 miles [8 km] southwest of Guadalajara, 17 Nov 1930, *M. E. Jones 27780* (POM).

ILLUSTRATION: see synonymy.

Shrubs or trees, to 7+ m high; stems distally quadrate, winged on the angles; leaves opposite, petioles to 15 cm long, winged, usually auriculate at bases, blades proper broadly ovate to rhombic in outline, usually 3(–9)-lobed with rounded sinuses, mostly pinnatinerved, sometimes obscurely triplinerved from near their bases, 12–30+ cm long, 7–20+ cm wide, margins of lobes subtentire to denticulate, both faces green, sparsely and minutely scabrellous; heads 30–60+ in crowded, compound corymbiform masses 12–30 cm across; peduncles 5–12(–30) mm long, strigosus-hispidulous to villous; involucre cylindric-campanulate, 4–5 mm high; phyllaries 15–20, greenish, herbaceous to somewhat scarious, strongly graduate, the outer shorter, linear-oblong, the inner thinner, more lanceolate, somewhat navicular, all sparsely hispidulous; receptacles slightly convex; paleae stramineous or darkened, scarious to membranous, oblong, navicular, 4–5(–ultimately, 8) mm long, acute; ray florets 5–8(–21), fertile, corollas yellow, often with darker nerves, tubes ca. 1 mm long, sparsely pubescent, laminae ovate-elliptic, 2–5+ mm long; disc florets 12–20(?–50), corollas yellow, becoming darker, greenish, tubes, lower throats, and margins of lobes sparsely hairy, tubes ca. 1 mm long, throats

slightly ampliate, cylindric, ca. 2.5 mm long, lobes deltate, ca. 0.5 mm long; style branches ca. 1.5 mm long, minutely hispidulous, penicillate; cypsela bodies blackish, becoming corky-white, oblanceolate in outline, 4–5 mm long, glabrous, wings scarious, ultimately 1–2 mm wide; pappi of 2, erect, subequal, stramineous awns 2–4 mm long; $2n = 34$; flowering Oct.

Wooded slopes in Tropical Rain and Evergreen Seasonal forests; rare in Northern and Eastern highlands; 500–1250 m. Mex. (Sin., Dgo., Nay., Jal., Cma., Mich., Méx., Mlos., Pue., Gro., Oax., Chis.). CHIAPAS COLLECTIONS: *BLT 15444* (CAS, TEX); 46789; 46937.

8. *Verbesina gigantea* Jacq., Icon. pl. rar. 1:17, t. 1775. 1781.

— TYPE: no specimen seen; use of this name here is based on the illustration.

ILLUSTRATION: see protologue.

Robust, shrubs, 2(–4) m high; stems glabrous or nearly so, often reddish purple, not winged; leaves alternate, petioles narrowly to broadly winged to bases, 4–8+ cm long, usually auriculate at bases, blades broadly lanceolate to ovate in outline, pinnatinerved, 12–25(–40) cm long, 5–14(–25) cm wide, usually sinuately to deeply lobed, lobes and apices acute, abaxial faces greenish to grayish, tomentose to pilose, sometimes glabrescent, adaxial faces scabrellous to scarious; heads 100–150+ in corymbiform masses 20–30+ cm across; peduncles 1–20 mm long, densely pilose to tomentose; involucre cylindric-campanulate, 4–6 mm high; phyllaries mostly 13–16, greenish to stramineous, strongly graduate, the outer shorter, all lance-linear to linear, acute to acuminate, piloso-strigillose; receptacles slightly convex; paleae stramineous, scarious to membranous, weakly to strongly navicular, 5–8 mm long, acute to acuminate; ray florets 5–8, fertile, corollas white, tubes ca. 1.5 mm long, pilose, laminae linear-oblong, ca. 3 mm long; disc florets 15–25+, corollas white (to ochroleucous?), tubes ca. 1.2 mm long, throats cylindric-funnelform, ca. 1.5 mm long, tubes and proximal throats pilose, lobes lance-triangular, ca. 0.8 mm long; style branches ca. 1 mm long, hispidulous, attenuate; cypsela bodies blackish, narrowly cuneate to oblanceolate, 4–6 mm long, 1.1–1.4 mm wide, glabrous or very sparsely tuberculate-hairy, wings stramineous, 0.4–0.9 mm wide distally, narrower proximally, ciliolate; pappi of 2 erect awns 3–4 mm long.

Poorly known from Central Depression; elsewhere reported from various habitats at 120–1100(–3000) m. Southern Mex. (Camp., Chis.), Guat., Hond., Salv., Pan.; Antill.; S.A. (Col.). CHIAPAS COLLECTIONS: *Pan 2118* (TEX); *P 9124* (UC); 13909.

9. *Verbesina guatemalensis* B. L. Rob. & Greenm., Proc. Amer. Acad. Arts 34:550. 1899.

— TYPE: Guatemala, Amatitlan, Palin, 1100 m, Feb 1892, *J. Donnell Smith 2860*. (GH).

All Chiapan collections of *Verbesina guatemalensis* are referable to:

9a. *Verbesina guatemalensis* B. L. Rob. & Greenm. var. *glabrata* Standl. & Steyer., Publ. Field Mus. Nat. Hist., Bot. Ser. 23:109. 1944.

— TYPE: Guatemala, Zacapá, lower slopes of Sierra de las Minas, trail above Río Hondo, 250–900 m, Oct 1939, *J. A. Steyermark* 29505 (F).

ILLUSTRATION: none found.

Shrubs or trees, to 5 m high; stems sparsely strigillose, often glabrate, not winged; leaves alternate, sessile, blades narrowly lanceolate to oblanceolate, pinnatinerved, 12–18+ cm long, 3–4+ cm wide, bases subauriculate, margins serrate or subentire, apices acute to acuminate, abaxial faces green, puberulent, adaxial faces very sparsely scabrelous with broad-based hairs; heads mostly 80–150+ in corymbiform to paniculiform masses to ca. 20 cm across; peduncles 5–15 mm long, densely tomentose; involucre campanulate to nearly hemispheric, ca. 6–8 mm high; phyllaries ca. 21 including 8 shorter, linear bracteoles, phyllaries proper greenish stramineous, lanceolate, navicular, somewhat indurate, puberulent, ciliolate; paleae stramineous, often purple-tipped, navicular, very narrow, ca. 7 mm long, apices acute, often inflexed; ray florets 3–5, fertile, corollas white, tubes ca. 2 mm long, pilose, laminae suborbicular, ca. 2.5 mm long; disc florets 15–30, corollas white, tubes 1.2–1.5 mm long, throats nearly cylindric, 2–2.5 mm long, tubes distally and throats proximally pilose, lobes deltate-ovate, ca. 0.5 mm long; style branches ca. 1.5 mm long, somewhat hispidulous-dilated apically; cypselas bodies blackish, oblanceolate, 4–5 mm long, 1.5–2 mm wide, glabrous or nearly so, wings shiny, stramineous, glabrous, ca. 1 mm wide distally, narrower proximally, ciliolate; pappi of 2 erect, equal to subequal awns 1.5–2.5 mm long.

Steep slopes and dry ravines in second growth forests; rare in SE Sierra Madre; 1100–1700 m. Southern Mex. (Chis.), Guat., Hond. CHIAPAS COLLECTIONS: 41595; 46335.

10. *Verbesina hypargyrea* B. L. Rob. & Greenm., Proc. Amer. Acad. Arts 34:556. 1899.

— TYPE: Mexico, Chiapas, between Hacienda Juncana and San Vicente, 1300–1800 m, 12 Dec 1895, *E. W. Nelson* 3510 (GH).

ILLUSTRATION: none found.

Shrubs or trees, to 3 m high; stems winged or not; leaves alternate, petioles 8–30 mm long, narrowly winged, blades narrowly lanceolate, pinnatinerved, 6–15(–22) cm long, 1–3(–4+) cm wide, bases narrowly cuneate, decurrent onto petioles, margins serrate to callous-denticulate, apices acuminate, abaxial faces whitened or silvery with fine, appressed hairs, adaxial faces bright to dark green, minutely and sparsely puberulent; heads mostly 3–15(–60) in congested corymbiform associations 5–12(–18) cm across; peduncles 5–15(–30) mm long, hirtellous; involucre broadly hemispheric to saucer-shaped, 9–12 mm diam.; phyllaries 9–12, obscurely biseriate, subequal, herbaceous, oblanceolate to spatulate, becoming reflexed; receptacles ovoid; paleae stramineous, navicular, carinate, 4–5 mm long, acuminate; ray florets none or ca. 8, fertile,

corollas yellow, tubes ca. 0.7 mm long, pilose, laminae ovate, 2–5 mm long; disc florets ca. 40–70+, corollas yellow, drying to cinnamon brown, tubes ca. 0.5 mm long, densely pilose, tubes ampliate, stoutly cylindric, ca. 2 mm long, lobes rounded-deltate, ca. 0.7 mm long; style branches stout, ca. 1.5 mm long, abruptly penicillate; cypselas bodies blackish, obovate in outline, sometimes trigonous in cross section, ca. 2 mm long, subglabrous, wings stramineous, mostly less than 0.5 mm wide, narrower proximally; pappi of 2(–3) stout, erect awns ca. 1 mm long; flowering mostly Oct–Jan.

Steep slopes and open hillsides in Pine-Oak and Pine-Oak-*Liquidambar* forests; uncommon in Northern Highlands and Eastern Highlands, on Central Plateau, and in Central Depression; (500–)1000–1800 m. Southern Mex. (Chis.), Guat. CHIAPAS COLLECTIONS: *Cro* 64930 (UC); *Cro* 64949 (CAS, TEX, UC); *Crq* 10491 (DS, F, TEX); *RMK* 3044 (DS, TEX, UC); *EWN* 3510 (GH); *Pan* 2125 (TEX); *Prat* 958 (TEX); *Sund* 24564 (TEX); *T&L* 41351 (DS); *Urb* 2895 (LL); *Urb* 2897 (TEX, LL); *We* 17945 (UC); 7917; 13137; 46978; 47521; 48884; 53800; 58380; 70792.

11. *Verbesina hypoglaucula* Schultz-Bip. ex Klatt, Leopoldina 23:144. 1887.

— TYPE: Mexico, “Cumbre de Acalcingo,” Dec 1841, F. M. Liebmann 485 (Pl. Mex. 8721) (C: isotype: F!).

ILLUSTRATION: none found.

Shrubs, 1–3 m high; stems mostly terete, sometimes quadrate, not winged; leaves usually opposite (alternate in *D. E. Breedlove* 55827, CAS), petioles ca. 1–4 mm long, blades lanceolate, pinnatinerved, (3–)5–12 cm long, (8–)15–38 mm wide, bases broadly to narrowly cuneate, margins serrulate with tiny, callous teeth, obscurely revolute, apices acute to acuminate, abaxial faces whitened, sericeous with fine, appressed hairs, adaxial faces green, sparsely strigose; heads 15–40+ in flat-topped corymbiform or ovoid paniculiform masses 10–25 cm across; peduncles 1–4 cm long, densely appressed-hairy; involucre broadly turbinate to hemispheric to saucerlike; phyllaries 5–8(–13), 2–3-seriate, herbaceous, the outer linear to spatulate, 7–15 mm long, similar to subtending leaves or bracts, the inner shorter; receptacles ovoid to conic; paleae greenish-stramineous to purplish, scarious, navicular, obscurely, if at all, carinate, 6–7 mm long, obtuse to acutely cuspidate, medially ciliolate; ray florets 7–13, neuter or styliiferous and sterile, corollas yellow with darker nerves, tubes ca. 2 mm long, pilose, laminae linear-oblong to ovate, 10–15 mm long; disc florets 40–60+, corollas greenish yellow, sometimes with red-orange lobes, tubes narrowly cylindric, ca. 1.5 mm long, strigose, throats ampliate, campanulate, ca. 2.5 mm long, proximally strigose, lobes subequal, 0.6–0.9 mm long, subglabrous; style branches stout, ca. 1.3 mm long, minutely hispidulous, abruptly penicillate; cypselas bodies blackish brown, cuneate, 4–6 mm long, ca. 1.5 mm wide, subglabrous to sparsely strigose, wings very narrow, ciliolate (some cypselas not winged, merely callous-margined and ciliolate); pappi of 2 slender, erect awns 2.5–3.5 mm long; $2n = 32, 32+1$.

Steep slopes in Evergreen Cloud Forest; rare on Central Plateau, uncommon in E Sierra Madre; 2100–3500 m. Southern Mex. (Mich., Pue., Ver., Gro., Oax., Chis.), Guat. CHIAPAS COLLECTIONS: 22803; 24358; 29389; 41751; 46289; 55827; 58189.

12. *Verbesina hypsela* B. L. Rob., Proc. Boston Soc. Nat. Hist. 31:269. 1904.

TYPE: Mexico, "on plains of Chiapas," Nov–Dec, *A. B. Ghiesbreght* 782 (GH).

ILLUSTRATION: none found.

Robust, herbs, to 3 m high; stems often purplish, glabrous, conspicuously winged by decurrent petiole bases; leaves alternate, petioles 5–10+ cm long, winged, blades deltate or elliptic in outline, pinnatinerved, 10–30 cm long, deeply pinnately parted, the lobes in 3–8 pairs, narrowly lanceolate, mostly 3–8+ cm long, 5–10+ mm wide, margins subentire, abaxial faces green, densely pilose or scabrellous (reported to be glabrate), adaxial faces glabrous or scabrous; heads ca. 150–350+ in pyramidal to ovoid, paniculiform or flat-topped, corymbiform masses to ca. 30 cm across; peduncles to ca. 12 mm long, hirtellous; involucre campanulate, ca. 4–6 mm high; phyllaries 18–22, greenish to stramineous, the outer much shorter, all herbaceous, lance-linear, ciliate, acute; receptacles convex; paleae greenish to stramineous, linear, navicular, ca. 4.5 mm long, hispidulous, acute; ray florets 3–5, styliiferous, sterile, corollas white, tubes 1.5–2 mm long, pilose, laminae 2–8 mm long; disc florets ca. 20+, corollas white, tubes ca. 1.5 mm long, throats slightly dilated, ca. 1.4 mm long, tubes distally and throats proximally pilose, lobes lance-triangular, ca. 0.8 mm long; style branches very slender, ca. 1.5 mm long, minutely hispidulous; cypselas bodies blackish brown, obovate, basally attenuate, 4–5 mm long, wings shiny, translucent, to 1 mm wide; pappi of 2 very slender awns ca. 2 mm long.

Shrubby slopes in Pine-Oak Forest; infrequent on Central Plateau and in cen. Sierra Madre; 975–1500 m. Southern Mex. (Chis.), Guat. CHIAPAS COLLECTIONS: *G* 782 (type); *L* 2151 (DS); 30195; 46761; 53795.

13. *Verbesina lanata* B. L. Rob. & Greenm., Proc. Amer. Acad. Arts 34: 558. 1899.

— TYPE: Guatemala, Alta Verapaz, Cobán, Feb 1888, *H. von Tuerckheim s.n.* (ed. J. Donnell Smith 1344) (GH!; isotype: GH!). [Olsen (1985) suggested lectotypification on specimen in MO.]

ILLUSTRATION: none found.

Trees or shrubs, 3–15 m high, trunks to 20 cm diam.; young stems usually densely pilose or appressed-puberulent, usually with sordid hairs, stems not winged; leaves alternate, petioles 1–10 cm long, often somewhat winged by decurrent blade bases, blades proper broadly oblanceolate, pinnatinerved, usually very thin, 15–30(–60) cm long, 6–18(–30) cm wide, bases cuneate-decurrent onto petioles, margins entire or obscurely and remotely callous-dentate, apices acute to shortly acuminate, both faces green, sparsely pilosulous, usually glabrate; heads ca. 150–250 in rather open corymbiform masses 25–35+ cm across; peduncles mostly 5–20 mm long, densely tomentose; involucre cylindric-campanulate, 4–6 mm high; phyllaries ca. 21, dark green to purplish, strongly graduate, the outer shorter, all oblong to linear, pilosulous, ciliate, apically obtuse to rounded; receptacles ± flat; paleae stramineous to purplish, membranous to scarious, navicular, linear, 4.5–6.5 mm long, apically obtuse, erose; ray florets 8–10, apparently fertile, corollas white, tubes 1.5–2 mm long, pilose, laminae linear-ob-

long, 5–8 mm long; disc florets ca. 25, corollas white to ochroleucous, tubes stout, ca. 0.5 mm long, pilose; throats nearly cylindric, ca. 2–3 mm long, lobes lance-triangular, ca. 0.6 mm long; style branches ca. 1 mm long, hispidulous, attenuate; cypselas bodies dark brown, narrowly cuneate, basally attenuate, 3.5–5 mm long, 0.8–1.2 mm wide, subglabrous to sparsely pilose, wings stramineous, 0.2–0.7 mm wide, ciliate; pappi of 2 erect, subequal awns 3.5–4.5 mm long.

Slopes in Montane Rain and Pine-Oak forests; uncommon on SE Central Plateau and in adjacent Northern and Eastern highlands; (760–)1250–1700 m. Southern Mex. (Chis.), Guat., Bel., Hond., Nic., C.R. CHIAPAS COLLECTIONS: *VQ* 2429 (TEX); *TW* 2412 (CAS, TEX); 9731; 22287; 29620; 41911; 48737; 55027; 56098; 56590.

14. *Verbesina myriocephala* Schultz-Bip. ex Klatt, Leopoldina 23:144. 1887.

— TYPE: Mexico, "Augustin" (i.e., San Augustín, Oaxaca, near 96 W, Oct 1842), *F. M. Liebmann* 271 (C).

Verbesina gigantoides B. L. Rob., Proc. Amer. Acad. Arts 47:213. 1911. — TYPE: Mexico, Chiapas, near Yajalon, 21 Nov 1895, *E. W. Nelson* 3423 (GH!; isotype: US).

ILLUSTRATION: none found.

Robust, herbs or shrubs, to 3(–5) m high; stems glabrous or nearly so, not winged; leaves alternate, petioles 12–20 cm long, not winged, blades broadly lanceolate to ovate in outline, pinnatinerved, 13–30(–40) cm long, pinnately lobed, rachises narrowly to broadly winged, lobes 5–9, lanceolate, often attenuate, abaxial faces greenish to grayish, densely pilose to tomentose or sublanate, adaxial faces scabrellous or glabrous and vernicose; heads 200–300 in pyramidal to ovoid corymbiform to paniculiform masses 20–30+ cm across; peduncles 3–15 mm long, sparsely to densely pilose; involucre cylindric-campanulate, 4–6 mm high; phyllaries mostly 9–15, stramineous to greenish or purplish, strongly graduate, the outer shorter, all lance-linear to oblanceolate, acute, subglabrous or glabrous but for ciliate margins; receptacles convex to conic; paleae stramineous, often purplish distally, navicular, scarious to membranous, 4–6 mm long, acute to obtuse; ray florets 3–5, fertile, corollas white, tubes ca. 2 mm long, sparsely pilose, laminae linear-oblong to ovate, ca. 4–5 mm long; disc florets ca. 12–20+, corollas white, tubes 1.5–2 mm long, throats nearly cylindric, 1–1.5 mm long, tubes and adjacent throats sparsely pilose, lobes lance-triangular, ca. 0.8 mm long; style branches ca. 1 mm long, hispidulous, attenuate; cypselas bodies dark brown, oblanceolate, basally attenuate, often trigonous, ca. 3.5 mm long, ca. 1.1 mm wide, subglabrous or sparsely hairy, wings stramineous, ca. 0.1 mm wide or wanting; pappi of 2(–3) slender, erect awns ca. 2 mm long; flowering mostly Oct–Dec.

Wooded and shrubby slopes in Lower Montane Rain, Evergreen Seasonal, Tropical Deciduous, Pine-Oak-Liquidambar, and Pine-Oak forests; common on Central Plateau and in Central Depression, uncommon on adjacent Northern Highlands and in Sierra Madre; 320–1725 m. Southern Mex. (Gro., Oax., Chis.), Guat., Hond., Nic., C.R. CHIAPAS COLLECTIONS: *Cro* 65044 (CAS, UC); *Cra* 9672 (TEX); *L* 2674 (DS); *EM* 16032 (CAS, F, LL); *Prat* 959 (CAS, TEX); *SC* 292 (CAS); *T* 139 (DS); *T* 1547 (DS, F, LL); *T* 1576 (DS); *T* 1726 (DS, F); *T* 5138 (TEX); *TW* 2296 (TEX); 7459; 7665; 13430; 14199;

14208; 20226; 28435; 38335; 42263; 46025; 46397; 56840; 70311.

15. *Verbesina neriifolia* Hemsl. in F. Godman and O. Salvin, Biol. cent.-amer., Bot. 2:188. 1882.

— TYPE: Mexico, "Chiapas &c.," *A. B. Ghiesbreght* 528 (K).

Verbesina phyllolepis S. F. Blake, J. Wash. Acad. Sci. 33:270. 1943. — TYPE: Mexico, Chiapas, Mt. Ovando, in pineland, 14–18 Nov 1939, *E. Matuda* 3953 (MICH; fragments: US; isotype: TEX!).

ILLUSTRATION: none found.

Shrubs, 1–3 m high; stems winged, at least distally; leaves alternate, petioles winged by decurrent blade bases, blades narrowly lanceolate to oblanceolate, pinnatinerved, mostly 6–15(–25) cm long, 8–25(–30) mm wide, margins subentire to obscurely callous-denticulate (rarely coarsely toothed, e.g., *D. E. Breedlove* 24706), abaxial faces usually whitened with fine, appressed hairs, sometimes pale green and sparsely hairy, adaxial faces green, glabrous or sparsely puberulent; heads borne singly or in loose, leafy, corymbiform clusters of 3–12+, the clusters to 15 cm across; peduncles 5–55 mm long, often winged; involucre broadly turbinate; phyllaries ca. 15 in 2 series, herbaceous, similar to peduncular bracts, more linear, 6–12 mm long, 1–2 mm wide; receptacles broadly convex; paleae stramineous, scarious, navicular, 6–7 mm long, weakly carinate, distally indurate, mucronulate; ray florets 15–20, styliferous, sterile, corollas golden yellow, drying yellow or brown, tubes ca. 2 mm long, pilose, laminae linear, 12–20 mm long; disc florets ca. 60–90+, corollas yellow, often drying reddish brown, tubes 1–1.5 mm long, pilose, throats slightly ampliate, cylindric, 2.5–3 mm long, lobes lance-linear, 0.7 mm long, papillate on adaxial margins; style branches ca. 2 mm long, minutely hispidulous distally; cypsela bodies blackish, dull or shiny, cuneate to oblanceolate, 2.5–3 mm long, 1.1–1.4 mm wide, sparsely appressed-pubescent distally, margins ciliate, not winged; pappi of 2 equal to subequal awns 1.5–3 mm long; flowering mostly Nov–Dec.

Canyon walls, wooded slopes, and open hillsides in Montane Rain, Evergreen Seasonal, Tropical Deciduous, and Pine-Oak forests; locally common in Northern Highlands and on Central Plateau, infrequent on Pacific Coastal Plain; 670–2480 m. Southern Mex. (Oax., Chis.). CHIAPAS COLLECTIONS: *A* 1367 (DS); *C&L* 428 (CAS); *Co* 5014 (CAS, TEX); *Cro* 46333 (MO, UC); *Cro* 64889 (CAS, TEX, UC); *Del* 859 (CAS); *G* 528 (type); *GL* 227 (TEX); *RMK* 3090 (TEX); *KL* 812 (TEX); *EL* 5861 (DS); *Lan* 812 (TEX); *L* 415 (DS); *L* 1229 (DS); *L* 2551 (DS); *L* 2955 (DS); *Lo* 201 (CAS); *EM* 3953 (type); *EM* 5204 (F, LL); *Pa* 195 (CAS); *Pan* 2130 (TEX); *Prat* 1109 (CAS, TEX); *R&B* 19888 (DS, F); *SR* 613 (CAS); *SI* 2118 (TEX); *SI* 2333 (TEX); *Spe* 6958 (UC); *T&L* 40038 (DS, RSA); *T* 1851 (DS); *T* 3350 (DS); *T* 3963 (DS, F, LL); *Urb* 3000 (TEX); *TW* 2398 (CAS); 7993; 8983; 23093; 23866; 24706; 32438; 39536; 41297; 41818; 46344; 48062; 48455; 49283; 49787; 53762; 55995; 56331; 58498; 60200; 66997.

16. *Verbesina oligantha* B. L. Rob., Proc. Amer. Acad. Arts 47:214. 1911.

— TYPE: Mexico, Guerrero, Jimalcota [58 km NE of Petatlán fide McVaugh 1951], 300 m, 18 Nov 1898, *E. Langlasse* 644 (GH).

ILLUSTRATION: none found.

Shrubs or trees, to 7 m high; stems terete, not winged, the older marked with lenticels; leaves opposite, petioles 1–3 cm long, distally winged, blades rhombic-ovate, sub-triplinerved, 12–20 cm long, 3–7 cm wide, bases cuneate, margins denticulate to serrate, apices acuminate to attenuate, abaxial faces green, scabrelous to hispidulous, adaxial faces scabrelous; heads 50–75+ in crowded, corymbiform or paniculiform associations 15–30 cm across; peduncles 5–15 mm long; involucre narrowly turbinate to campanulate, 3–5 mm high; phyllaries 8–13, ovate to linear-oblong or lanceolate, the outer shorter, obtuse, the inner acuminate, usually puberulent, sometimes glabrate; receptacles convex; paleae yellowish to stramineous, membranous to chartaceous, 5–8(–12+) mm long; ray florets none or 1–3, usually neuter, sometimes pistillate, corollas yellow, tubes 2 mm long, pilose, laminae elliptic-ovate, 2–6(–8) mm long; disc florets 4–9(–11), corollas yellow, glabrous or nearly so, tubes ca. 1.5 mm long, throats 3–4 mm long, lobes acute, ca. 1 mm long; style branches ca. 2 mm long; cypsela bodies greenish black, oblanceolate, ca. 6 mm long, distally sparsely pubescent, wings stramineous, 1–1.5(–2) mm wide; pappi of 2 slender, hispidulous or ciliate, subequal to equal awns 3–6 mm long.

Tropical Deciduous Forest (?); rare in Central Depression/Sierra Madre; 675–1850 m. Southern Mex. (Jal., Mich., Gro., Oax., Chis.). CHIAPAS COLLECTIONS: *EM* 798 (MICH, fide Turner 1985); *Nee* 32342 (TEX); *Pan* 2108 (TEX).

17. *Verbesina persicifolia* DC., Prodr. 5:614. 1836.

— TYPE: Mexico, Tamaulipas, "inter Santander et Victoria," *J. L. Berlandier* "2209" (G-DC).

Silphium arborescens Mill., Gard. dict., ed. 8. no. 4. 1768. — *Verbesina arborescens* (Mill.) S. F. Blake, J. Bot. 553:57. 1915, not M. Gomez, 1890. — TYPE: Mexico, Veracruz, 1731, *W. Houston* s.n. (BM).

Zexmenia lindenii Schultz-Bip. in B. C. Seemann, Bot. voy. Herald 306. 1856. — [*Lasiantha lindenii* Schultz-Bip., pro syn., loc. cit.] — *Verbesina lindenii* (Schultz-Bip.) S. F. Blake, Contr. U.S. Natl. Herb. 26:256. 1930. — TYPE: Mexico, Veracruz, Mirador, 3000' [914 m], Oct 1838, *J. J. Linden* 1197 (in Schultz-Bip. collection at P fide Blake, Contr. U.S. Natl. Herb. 26:256. 1930).

Verbesina olivacea Klatt, Leopoldina 20:93. 1884. — *Otopappus olivacea* (Klatt) Klatt, Ann. K. K. Naturhist. Hofmus. 9:362. 1894. — TYPE: Mexico, "Hacienda de la Laguna," 1828, *C. J. W. Schiede* 340 (B, destroyed; tracing and fragment: GH).

ILLUSTRATION: none found.

Shrubs, to 4 m high; stems not winged; leaves alternate, petioles 1–2 cm long, blades narrowly lanceolate to lance-ovate or ovate, pinnatinerved, mostly 10–25+ cm long, 2–9+ cm wide, bases narrowly cuneate, decurrent onto petioles, margins serrate to denticulate or subentire, apices acuminate to attenuate, abaxial faces green to grayish, glabrous or pilosulous to tomentulose, adaxial faces strigillose; heads 8–20+ in corym-

biform or paniculiform associations 7–15 cm across; peduncles 10–25+ mm long, densely strigillose, often bracteolate; involucre broadly campanulate to hemispheric or broader, 7–12 mm diam.; phyllaries ca. 15, greenish-stramineous or darker, basally indurate, distally scarious, ovate to oblong, ciliate; receptacles convex to broadly ovoid; paleae stramineous, scarious to chartaceous, distally somewhat indurate, navicular, 5–8 mm long, obscurely carinate, obtuse to acute; ray florets 13–21, fertile, corollas yellow, often fading, tubes ca. 1.5 mm long, pilose, laminae ovate to oblong, 4–5 mm long; disc florets 80–100+, corollas pale yellow, tubes ca. 0.7 mm long, pilose, throats narrowly cylindric, ca. 2.5 mm long, basally pilose and with scattered hairs distally, lobes lance-ovate, 0.7 mm long, papillate on adaxial margins; style branches slender, ca. 1.5 mm long, minutely hispidulous at abruptly penicillate tips; cypselas bodies blackish, trigonous (ray) or flattened (disc), obovate to cuneate in outline, 3–3.5 mm long, glabrous or nearly so, wings none or to 0.8 mm wide, margins or wings ciliate; pappi none (ray) or of 1–2 awns 1.5–2 mm long (disc); $2n = 34$.

Evergreen Seasonal and Tropical Deciduous forests and Thorn Woodland; rare in Northern Highlands and Sierra Madre; 670–860 m. Eastern and southern Mex. (N.L., Tam., S.L.P., Ver., Oax., Tab., Chis.). CHIAPAS COLLECTIONS: *Calz* 4063 (TEX); *Crq* 10455 (DS, TEX); 39933; 47970.

18. *Verbesina perymenioides* Schultz-Bip. ex Klatt, Leopoldina 23:143. 1887.

— *Otopappus perymenioides* (Schultz-Bip. ex Klatt) Klatt, Ann. K. K. Naturhist. Hofmus. 9:362. 1894. — TYPE: Mexico, Oaxaca, “Yavesia,” *F. M. Liebmann* 330 (C?).

Verbesina steyermarkii Standl., Publ. Field Mus. Nat. Hist., Bot. Ser. 22:320. 1940. — TYPE: Guatemala, Chiquimula, between Chiquimula and La Laguna, 500–1000 m, 27 Oct 1939, *J. A. Steyermark* 30698 (F!).

ILLUSTRATION: none found.

Shrubs, 2–3(–6) m high; stems not winged; leaves alternate, petioles mostly 5–20 mm long, distally winged, blades lanceolate to oblanceolate, pinnatinerved, (6–)12–18 cm long, (1–)2–5 cm wide, lengths 4–5 times widths, bases narrowly cuneate, margins subentire to serrate, apices acuminate to attenuate, abaxial faces green, subglabrous to densely piloso-strigillose, adaxial faces subglabrous to closely strigillose with fine hairs; heads 30–100+ in terminal, congested, corymbiform associations 8–15 cm across; peduncles mostly 1–15 mm long, densely hirsutulous; involucre campanulate to turbinate, 3–4 mm high; phyllaries 7–15, stramineous to greenish or purplish, ovate to oblong, apically rounded-subtruncate, membranous, ciliate; receptacles ovoid; paleae stramineous to purpletinged, scarious to membranous, navicular, ca. 3–4 mm long, obscurely carinate, ciliate abaxially on carina, obtuse to acute; ray florets 8–15, fertile, corollas yellow, tubes ca. 1 mm long, pilose, laminae ovate, 2–3 mm long; disc florets ca. 20–30, corollas greenish yellow, tubes ca. 0.5 mm long, pilose, throats very narrowly funnelform, ca. 2 mm long, sparsely pilose at bases, lobes lance-ovate ca. 0.5 mm long; style branches slender, ca. 1.5 mm long, hispidulous and abruptly penicillate at tips; cypselas bodies dark reddish brown, cuneate in outline, 1.5–2.5 mm long, 0.7–1 mm wide, glabrous, wings none or very

narrow, hyaline, margins or wings ciliate; pappi of (0–)2 slender awns 1–2 mm long.

Open, often disturbed slopes in Evergreen Seasonal, Tropical Deciduous, and Pine-Oak forests and in Thorn Woodland; rare in Eastern Highlands, common on Central Plateau and in Central Depression; 600–1800+ m. Southern Mex. (Gro., Oax., Chis.), Guat., Hond. CHIAPAS COLLECTIONS: *And* 13554 (CAS); *Calz* 3878 (TEX); *Crq* 9671 (TEX); *Crq* 10861 (DS, F, TEX); *Da* 29992 (UC); *F&L* 3247 (CAS, TEX); *Glie* CH-58 (DS, TEX); *GL* 292 (CAS); *L* 2414 (DS); *L* 2591 (DS); *Lo* 236 (CAS); *Pa* 182 (CAS); *RM* 572 (CAS); *SR* 648 (CAS); *T* 1388 (DS); *T* 3112 (DS, LL); *T* 9346 (TEX); *T* 9405 (TEX); *Urb* 3004 (LL); 13088; 13169; 13431; 13804; 14056; 14110; 20178; 21921; 30522; 42315; 46009; 53818; 70448; 70570.

Jose L. Panero 2129 (UC) from 6 km s of Aguacatenango was labelled as a hybrid (*V. perymenioides* × *V. punctata*) by Panero.

19. *Verbesina petzalensis* Standl. & Steyermark., Publ. Field Mus. Nat. Hist., Bot. Ser. 23:147. 1944.

— TYPE: Guatemala, Huehuetenango, E of San Rafael Petzal, near crossing of Río San Juan Ixtán, ca. 1730 m, 9 Jan 1941, *P. C. Standley* 82921 (F).

ILLUSTRATION: none found.

Shrubs, to 35 dm high; stems winged, densely pilose to tomentulose with sordid hairs; leaves alternate, sessile or winged-petiolate, blades lance-oblong to oblong-ovate, to 40(–50) cm long, to 11(–30) cm wide, pinnatinerved, bases cuneate, decurrent onto petioles, margins subentire or denticulate, apices acute to attenuate, abaxial faces green to grayish, strigose to densely pilosulous with short, sordid, erect or appressed hairs, adaxial faces scabrelous to scabrous; heads 30–60 in corymbiform associations 15–25 cm across; peduncles 5–10 mm long, densely villous-hispidulous; involucre campanulate, 4–4.5 mm high; phyllaries ca. 21, pale, lance-linear to oblong or obovate, apices obtuse to rounded and apiculate; receptacles ovoid, ca. 2 mm diam.; paleae stramineous, scarious, navicular, ca. 4.5 mm long, subglabrous, minutely carinate, distally indurate, acute; ray florets (8–)13–15, fertile, corollas white to ochroleucous, tubes 1.5 mm long, laminae oblong to ovate, 3–7 mm long; disc florets ca. 35–50, corollas white, tubes 0.5–0.8 mm long, throats very slender, 1.5–2.5 mm long, tubes and adjacent throats pilosulous, lobes deltate, 0.3–0.5 mm long; style branches 1–1.5 mm long, stigmatic almost to abruptly attenuate tips; cypselas bodies black, 2.5–3 mm long, 1–1.3 mm wide, basally cuneate-stipitate, minutely tuberculate or sparsely hairy on the faces, wings stramineous, ca. 0.5 mm wide; pappi of 2, erect awns ca. 2 mm long.

Wooded slopes along streams in Tropical Rain and Lower Montane Rain forests; infrequent in Eastern Highlands; 300–550 m. Southern Mex. (Chis.), Guat. CHIAPAS COLLECTIONS: 46890; 47480.

20. *Verbesina pleistocephala* (Donn.Sm.) B. L. Rob., Proc. Amer. Acad. Arts 43:41. 1907.

— *Encelia pleistocephala* Donn.Sm., Bot. Gaz. 13:189. 1888. — TYPE: Guatemala, "rocks near Cobán," 4300 ft. [1310 m], Feb 1887, *H. von Tuerckheim s.n.* (ed. J. Donnell Smith 1121) (not seen).

Verbesina donnell-smithii J. M. Coul., Bot. Gaz. 20:50. 1895. — TYPE: Guatemala, Quiché, San Miguel Uspantán, 6000–12,000 ft. [1829–3658 m], Apr, *E. T. Heyde and E. Lux 3385* (not seen).

ILLUSTRATION: none found.

Shrubs, to 25 dm high; stems not winged; leaves alternate, shortly petiolate, blades oblong-lanceolate to elliptic, 10–17 cm long, 20–45 mm wide, pinnatinerved, bases abruptly to gradually cuneate, decurrent onto distal ends of petioles, margins serrate or entire, apices acute to acuminate, abaxial faces ± green, scabrellous to sordid-pubescent, adaxial faces scabrous or dotted with bases of fallen hairs; heads 15–20+ in corymbiform associations 6–10 cm across; peduncles 3–16 mm long; involucre campanulate to turbinate, 5–6 mm high; phyllaries 12–14, green to purplish green, the outer shorter, obtuse, the inner oblong, acute; receptacles conical; paleae greenish to purplish, 6–7 mm long, navicular, acute, hirtellous; ray florets 5–6, neuter, corollas yellow, tubes ca. 1 mm long, laminae narrowly elliptic, 3–5 mm long; disc florets 25–35, corollas yellow, tubes ca. 1 mm long, minutely hispidulous, throats 2–2.5 mm long, lobes 0.5–0.8 mm long; style branches ca. 1 mm long; cypselas bodies black, oblanceolate-truncate, 3.5–6 mm long, wings ca. 0.8 mm wide; pappi of 2 awns 2–4 mm long; $2n = 34$.

Montane Rain and Pine-Oak-*Liquidambar* forests; rare on Central Plateau and in E Sierra Madre; 1600–2100 m. Southern Mex. (Chis.), Guat. CHIAPAS COLLECTIONS: 46182; 65771; 66034; 67797.

Verbesina pleistocephala may not be distinct from *V. apლეura*.

21. *Verbesina punctata* B. L. Rob. & Greenm., Proc. Amer. Acad. Arts 34:561. 1899.

— LECTOTYPE: (Olsen 1985:58): Guatemala, Santa Rosa, Casillas, 4000 ft. [1219 m], Nov 1892, *E. T. Heyde and E. Lux 4241* (US; isocototypes: F, GH, NY).

ILLUSTRATION: none found.

Robust, herbs or shrubs, to 4 m high; stems glabrous or puberulent, winged; leaves alternate, petioles narrowly to broadly winged, mostly 5–9 cm long, blades proper lance-ovate to ovate, pinnatinerved, 12–20(–40) cm long, 5–12(–20) cm wide, bases abruptly rounded and cuneate to broadly cuneate and decurrent onto petioles, margins subentire to coarsely serrate, apices acute to acuminate, abaxial faces green, minutely appressed-puberulent, adaxial faces scabrellous, the hair-bases sometimes forming white dots; heads 120–180+ in ovoid to flat-topped masses 15–25 cm across; peduncles 5–15 mm long, pilose; involucre campanulate to hemispheric, 4–6 mm high; phyllaries ca. 21, greenish stramineous, sometimes purplish with pale margins, graduate, lance-linear to lanceolate, the outer shorter, puberulent and ciliate, tips membranous, acute to acuminate; receptacles flat; paleae stramineous to purplish, scarious, navicular, lance-linear, 5.5–6.5 mm long, acute to

acuminate; ray florets mostly 8, fertile, corollas white, tubes ca. 1.5 mm long, laminae elliptic, ca. 5 mm long; disc florets ca. 50–75, corollas white, tubes ca. 1 mm long, throats ca. 2 mm long, tubes distally and throats proximally pilose, lobes triangular, ca. 0.5 mm long; style branches ca. 1.5 mm long; cypselas bodies purplish black, oblanceolate, 4.5–5 mm long, 1.4–1.6 mm wide, sparsely pilose, wings stramineous, shiny, ultimately 1 mm wide, ciliate; pappi of 2 slender, erect awns ca. 3.5 mm long.

Wet to dry, often wooded, slopes in Evergreen Seasonal, Tropical Deciduous, and Pine-Oak forests; uncommon on Central Plateau, in Central Depression, and in Sierra Madre; 500–1700(–2000) m. Southern Mex. (Chis.), Guat., Salv. CHIAPAS COLLECTIONS: *Calz 3880* (TEX); *L 2746* (DS); *EM 718* (LL); *EM 17070* (DS, UC); *Pa 2001* (CAS); *Pan 2124* (TEX); *Pan 2129* (TEX); *Prat 1099* (TEX); *T 3244* (DS, LL); 7919; 13434; 22577; 41519; 54099.

22. *Verbesina sousae* Fay, Brittonia 25:195. 1973.

— TYPE: Mexico, Chiapas, 13 miles [21 km] E of Tapantepec (Oaxaca), 2300 ft. [701 m], 31 Oct 1965, *A. Cronquist and M. Sousa 10456* (NY; isotypes: CAS!, DUKE, ENCB, F!, GH, KANU, MEXU, MICH, MSC, S, TEX, US, UTC).

ILLUSTRATION: Brittonia 25:196. 1973.

Shrubs, to ca. 3 m high; stems not winged; leaves alternate, petioles 1–3 cm long, blades lance-ovate to truncate, pinnatinerved, 9–15(–20) cm long, 3–6(–11) cm wide, bases cuneate, somewhat decurrent onto petioles, margins serrate, apices acute to acuminate, abaxial faces pilose to strigillose or hirtellous, adaxial faces green, sparsely scabrous; heads borne singly or in open, terminal corymbiform associations of 3–5; peduncles rather stout, 1–5 cm long, bracteolate, densely piloso-hirtellous; involucre broadly hemispheric to saucer-shaped, 15–20 mm diam.; phyllaries ca. 30 in 3+ series, dull tan, indurate at bases, distally greenish, scarious to membranous, all oblong, apically rounded to acute; receptacles convex; paleae stramineous, chartaceous to indurate, slender, navicular, 6–7 mm long, obscurely carinate, apically cuspidate; ray florets 30–50, fertile, corollas yellow, tubes ca. 2 mm long, pilose, laminae linear-oblong, ca. 10 mm long; disc florets ca. 200–300, corollas greenish yellow, tubes 1–1.5 mm long, densely piloso-hispid, basally oblique, throats very little dilated, cylindric, 2.5–3.5 mm long, hispidulous proximally, less so distally, lobes lance-ovate, ca. 0.7 mm long, papillate on adaxial margins; style branches slender, ca. 2.5 mm long, minutely hispidulous; cypselas bodies blackish brown, cuneate in outline, trigonous (ray) or flattened (disc), all glabrous, 3–4 mm long, wingless or very narrowly hyaline-winged distally; pappi of 0–1(–2) awns 2–3 mm long; flowering mostly Oct.

Chiapas endemic: Wooded slopes in Tropical Deciduous Forest; uncommon (perhaps locally common) in NW Sierra Madre; 700–850 m. CHIAPAS COLLECTIONS: *Crq 9669* (TEX); *Crq* (type); *Stu 4292* (TEX); 13719; 44447; 44448; 64900.

23. *Verbesina strotheri* Panero & Villaseñor,
Contr. Univ. Michigan Herb. 19:188.
1993.

— TYPE: Mexico: Chiapas, WSW of San Cristóbal de Las Casas, along trail to San Lucas, 2100 m, *J. L. Panero and A. Salinas 2526* (MEXU; isotypes: CAS, COL, ENCB, K, MA, MEXU, MICH, MY, QCA, RSA, SI, TENN, TEX, UCI, US).

ILLUSTRATION: Contr. Univ. Michigan Herb. 19:190. 1993.

Shrubs, 1–3 m high; stems puberulent, not winged; leaves opposite, petioles 1–6 cm long, distally winged, blades ovate to broadly ovate, deltate, or subpentagonal, 4–13 cm long, 2–10 cm wide, triplinerved from near bases, bases broadly cuneate to truncate, then ± decurrent onto petioles, margins coarsely toothed, apices acute, abaxial faces green, strigillose to hirsute, adaxial faces strigose; heads 3–25 in open dichasiod or thyriform associations 6–15 cm across; peduncles 5–50 mm long, puberulent; involucre cylindric-campanulate to hemispheric, 8–15+ mm high; phyllaries 18–27 in 3–4 series, graduate or subequal, the outer usually shorter, orbiculate to ovate, herbaceous, pubescent, sometimes spreading, the inner ovate to oblong, more scarious to membranous, sparsely puberulent or glabrous; receptacles flat to convex; paleae proximally pale green to stramineous, distally often darker, lanceolate, navicular, 9–12 mm long, glabrous, acute; ray florets 5–7, fertile, corollas pale yellow, tubes ca. 3 mm long, glabrous or nearly so, laminae ovate to elliptic, 10–15 mm long; disc florets 35–55, corollas pale yellow, tubes ca. 2 mm long, glabrous, throats slightly ampliate, cylindric, ca. 5 mm long, puberulent, lobes lance-ovate, ca. 1 mm long; style branches 1.5–2 mm long, penicillate; cypsela bodies grayish, oblanceolate, 5–8 mm long, wings to ca. 1.2 mm wide; pappi of 2 awns 0.3–0.5 mm long; $2n = 34$.

Chiapas endemic: Shrubby slopes in Pine-Oak Forest; rare on Central Plateau; 2100 m. CHIAPAS COLLECTIONS: *Pan 2526* (type); *SR 323* (CAS); *46337*; *46352*; *56000*.

24. *Verbesina turbacensis* Kunth, Nov. gen.
sp., ed. fol. 4:159. 1820 [1818]; ed. qto.
4:203. 1820.

— TYPE: Colombia, “Cresit prope Turbaco Novo-Granatensium,” 130 hex. [234 m], Apr. *A. von Humboldt and A. J. A. Bonpland s.n.? = Bonpland 1456?* (P, fide D’Arcy).

Verbesina sublobata Benth., Pl. hartw. 76. 1841. — TYPE: Guatemala, Sunil, C. T. Hartweg 536 (K; fragment: F!).

Verbesina nicaraguensis Benth., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 4(1852):97. 1853. — TYPE: Nicaragua, “Savannerne imellem Masaya og Granada,” *A. S. Oersted 131* (presumably in C; not seen).

ILLUSTRATION: none found.

Robust, herbs or shrubs, 1–3(–5) m high; stems usually conspicuously winged, sometimes obscurely or not at all winged, young stems densely pilose to tomentose with buffy to sordid hairs; leaves alternate, petioles 6–15 cm long, broadly to narrowly winged, wings usually auriculate and decurrent onto stems, blades broadly lanceolate or oblanceolate to deltate-ovate in outline, coriaceous, pinnatinerved, 10–25(–35) cm long, 6–18+ cm wide, bases gradually to abruptly contracted to the cuneately winged petioles, margins serrate or coarsely toothed to sinuately or pinnately lobed, usually callous-denticulate, apices acute to acuminate, abaxial faces greenish to grayish, sparsely to densely pilose, adaxial faces scabrelous with fine-tipped hairs; heads 150–300 in ovoid to flat-topped corymbiform associations 20–30+ cm across; peduncles mostly 2–12 mm long, pilose; involucre cylindric to broadly campanulate, 3.5–5 mm high; phyllaries ca. 21, pale greenish to darker, sometimes purplish, scarious, the outer shorter and narrower, all lance-linear to lanceolate or oblanceolate, proximally herbaceous, pilosulous, distally membranous, less hairy, apices acute to acuminate; receptacles conical; paleae stramineous to purplish, scarious, lance-linear, navicular, ca. 4.5 mm long, proximally pilosulous, distally membranous, less hairy, often cuspidate; ray florets 8(–12), fertile, corollas white, tubes 1.3–2 mm long, pilose, laminae ovate to oblong, 3–5 mm long; disc florets ca. 20–40+, corollas white, tubes 0.5–0.7 mm long, pilose, throats cylindric, ca. 2 mm long, proximally pilose, lobes narrowly triangular, ca. 0.5 mm long; style branches ca. 1.3 mm long, minutely hispidulous; cypsela bodies blackish, oblanceolate, 2–2.5 mm long, 1–1.2 mm wide, sparsely tuberculate and pilose, wings translucent or stramineous, 0.5–0.8 mm wide; pappi of 2 slender awns 1.5–2 mm long; $2n = 34$.

Steep banks, forest margins, or roadsides in Lower Montane Rain, Montane Rain, Evergreen Cloud, Pine-Oak-Liquidambar, and Pine-Oak forests; very common on Central Plateau; rare in Northern Highlands, Eastern Highlands, Central Depression, and Sierra Madre; (120–)800–2800 m. Southern Mex. (Ver., Oax., Chis.), Guat., Bel., Hond., Salv., Nic., C.R., Pan.; S.A. (Col., Ven.). CHIAPAS COLLECTIONS: *C&L 619* (CAS); *Cro 47529* (MO, UC); *Crq 10873* (DS, F, TEX); *GL 187* (TEX); *GG 251* (CAS, TEX); *GG 258* (CAS, TEX); *He 1086* (TEX); *L 2534* (DS); *L 2909* (DS); *Lo 138* (TEX); *Mz 9190* (TEX); *Mz 9499* (TEX, UC); *PM 102* (CAS, TEX); *Nee 32360* (TEX); *RM 567* (CAS); *SC 175* (CAS); *SC 287* (TEX); *SR 289* (CAS, TEX); *T 1328* (DS, F); *T 1336* (DS, LL); *T 1461* (DS, F); *T 1553* (DS, F); *T 1559* (DS); *T 1723* (DS, F); *T 4978* (TEX); *7277*; *7355*; *7480*; *11701*; *12588*; *12790*; *13615*; *13967*; *14072*; *20224*; *21020*; *22970*; *27796*; *30945*; *40913*; *41012*; *41294*; *41306*; *41655*; *41862*; *42478*; *42798*; *46236*; *46346*; *53221*; *53892*; *56839*; *66067*; *70474*.

76. VIGUIERA

Viguiera Kunth, Nov. gen. sp., ed. fol. 4:176. 1820 [1818]; ed. qto. 4: 224. 1820. — TYPE: *Viguiera helianthoides* Kunth = *Viguiera dentata* (Cav.) Spreng.

Leighia Cass. in F. Cuvier, Dict. sci. nat., ed. 2. 25: 435. 1822, non Scopoli 1777. — Usually included in synonymy of *Viguiera* by recent authors; nomenclatural status unclear to me. See protologue, Blake (1918), and entry in Index Nominum Genericorum.

- Bahiopsis* Kellogg, Proc. Calif. Acad. Sci. 2:35. 1863. — TYPE: *Bahiopsis lanata* Kellogg = *Viguiera lanata* (Kellogg) A. Gray.
Hymenostephium Benth. in G. Bentham and J. D. Hooker, Gen. pl. 2:382. 1873. — TYPE: *Hymenostephium mexicanum* Benth. = *Viguiera cordata* (Hook. & Arn.) D'Arcy.
Haplocalymma S. F. Blake, Proc. Amer. Acad. Arts 51:517. 1916. — TYPE: *Haplocalymma microcephala* (Greenm.) S. F. Blake = *Viguiera microcephala* Greenm.

Annuals, perennials, shrubs, and small trees, to 15 m high; leaves opposite or the proximal opposite, the distal alternate, mostly petiolate, sometimes sessile, sometimes margins decurrent onto stems, blades ovate to rhombic, deltate, lanceolate, or linear, often 3–5-nerved from at or near their bases, margins usually toothed or entire, rarely pinnately lobed, faces glabrous or variously hairy; heads borne singly or in loose corymbiform or paniculiform associations; peduncles usually slender, often bracteate; involucre hemispheric to campanulate or narrowly cylindric, 3–15(–25+) mm high; phyllaries 12–24(–30+) in 2–7 series, pale green to dark, purplish, usually strongly graduated, lance-linear or lanceolate to ovate, mostly herbaceous to cartilaginous, often basally indurate, glabrous or variously hairy; receptacles convex to conical; paleae persistent, scarious to herbaceous or cartilaginous, striate-nerved, conduplicate-navicular, carinate, often distally indurate and pungent; ray florets 5–15(–30+), neuter, corollas mostly yellow, sometimes ochroleucous, purplish, or white, tubes slender, glabrous or hirsute and/or glandular-puberulent, laminae oblong to ovate or spatulate; disc florets ca. 20–180+, bisexual, fertile, corollas mostly yellow, sometimes purplish, tubes narrowly cylindric, sometimes basally dilated, glabrous or hispidulous and/or stipitate-glandular, throats gradually dilated and funnellform or abruptly dilated and cylindric, mostly 2–3(–5) times as long as tubes, usually hispidulous and/or stipitate-glandular, at least at bases, lobes 5, deltate to lance-triangular or lance-linear, abaxially glabrous or hispidulous, adaxially papillate; stamen filaments often flattened, often hairy; style branches slender, hispidulous, attenuate to abruptly deltoid at tips; cypselae blackish to reddish brown, sometimes mottled, notably compressed or flattened or biconvex, quadrate-oval to cuneiform in outline, minutely striate, usually appressed-hirsute or strigillose with antrorse hairs; pappi none or of 1–2, elongate, often aristate, squamellae plus 0–4, shorter, erose to lacerate, free or connate, squamellae, usually persistent, sometimes fragile; $2n = 24, 34, 36$, and higher multiples.

About 150+ species ranging from western United States (Utah to Calif. and Tex.) through Mexico (where most species are found) to Argentina and Brazil.

REFERENCE: BLAKE, S. F. 1918. A revision of the genus *Viguiera*. Contr. Gray Herb. n.s. 54:1–195.

- a. Annuals or short-lived perennials; leaf blades narrowly lanceolate to lance-ovate 5. *V. tenuis*
 aa. Perennial herbs, shrubs, and trees; leaf blades mostly deltate-ovate to lanceolate.
 b. Trees to 15 m high; petioles with conspicuous, undulate wings; ray corolla laminae 25–35 mm long
 4. *V. puruana*
 bb. Perennial herbs or suffrutices; petioles narrowly, if at all, winged; ray corolla laminae 4–25 mm long.
 c. Petioles 1–3 mm long; larger leaf blades 25–50 mm long; phyllaries mostly 20–26 in 2–3 series. 3. *V. ovata*
 cc. Petioles mostly 5–25(2–50) mm long; larger leaf blades 5–15+ cm long; phyllaries mostly 12–16 in ± 2 series.
 d. Phyllaries mostly 6–15 mm long; ray florets mostly 8–12, corolla laminae mostly 8–25 mm long; disc florets ca. 100–180+; pappi of 2 aristate and 2–4 erose to lacerate squamellae . . . 2. *V. dentata*
 dd. Phyllaries mostly 2–6 mm long; ray florets mostly 5–8, corolla laminae mostly 4–12(–15) mm long; disc florets ca. 20–50; pappi none or of 3–4 lacerate squamellae 1. *V. cordata*

1. *Viguiera cordata* (Hook. & Arn.) D'Arcy, Phytologia 30:6. 1975.

- *Wedelia cordata* Hook. & Arn., Bot. Beechey Voy. 435. 1841. — *Hymenostephium cordatum* (Hook. & Arn.) S. F. Blake, J. Bot. 53: 268. 1915. — TYPE: Nicaragua, Realejo, G. Sinclair s.n. (K).
Gymnolomia microcephala Less., Linnaea 5:153. 1830. — *Hymenostephium microcephalum* (Less.) S. F. Blake, Contr. Gray Herb. n.s. 54:8. 1918, not Greenm., 1903. — TYPE: Mexico, "Prope Hacienda de la Laguna," Oct, C. J. W. Schiede and F. Deppe s.n. (not seen).
Wedelia subflexuosa Hook. & Arn., Bot. Beechey Voy. 435. 1841. — *Gymnolomia subflexuosa* (Hook. & Arn.) Benth. ex Hemsl. in F. Godman and O. Salvin, Biol. cent.-amer., Bot. 2:163. 1881. — TYPE: Nicaragua, Realejo, G. Sinclair s.n. (K; photograph and fragments: US!).

- Gymnopsis costaricensis* Benth., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 4:90. 1852. — *Aspilota costaricensis* (Benth.) Klatt, Bull. Soc. Roy. Bot. Belgique 31:201. 1892. — *Gymnolomia costaricensis* (Benth.) B. L. Rob. & Greenm., Proc. Boston Soc. Nat. Hist. 29:95. 1899. — TYPE: "I Bjergkovene paa Aguacate (c. 2000' [ca. 610 m]) og ved Ujaras i Costa-Rica (c. 4000' [ca. 1219 m])," A. S. Oersted s.n. (not seen).
Gymnopsis volcanica Steetz in B. C. Seemann, Bot. Voy. Herald 157. 1853. — TYPE: Panama, Veraguas, Chiriqui Volcano, B. C. Seemann s.n. (not seen).
Gymnolomia patens A. Gray, Proc. Amer. Acad. Arts 5:182. 1861. — TYPE: Mexico, "near Tantoyuca, around Wartenberg," 1858–1859, L. C. Ervendberg 95 (GH).
Hymenostephium mexicanum Benth., Hooker's Icon. Pl. 12:48, t. 1154. 1876 [1873]. — TYPE: Mexico, Cordova [Cordoba] Valley, E. Bourgeau 1932 (K).

Montanoa thomasi Klatt, Abh. Naturf. Ges. Halle 15:328. 1882. — TYPE: Veracruz, Orizaba, 1866, *Thomas s.n.* (not located; isotype: GH).

Gymnolomia ehrenbergiana Klatt, Leopoldina 23:90. 1887. — [*Microcephalum ehrenbergiana* Schultz-Bip. in sched. fide Klatt, l.c.] — TYPE: Mexico, "Alpatlahua," F. M. Liebmann "585" (C).

Gymnolomia patens A. Gray var. *abbreviata* B. L. Rob. & Greenm., Proc. Amer. Acad. Arts 29:387. 1894. — TYPE: Mexico, Jalisco, ravines near Tequila, 21 Sep 1893, C. G. Pringle 4595 (GH; isotype: UC!).

Gymnolomia patens A. Gray var. *guatemalensis* B. L. Rob. & Greenm., Proc. Boston Soc. Nat. Hist. 29:94. 1899. — *Gymnolomia microcephala* Less. var. *guatemalensis* (B. L. Rob. & Greenm.) B. L. Rob. & Greenm., Proc. Amer. Acad. Arts 39:101. 1903. — *Gymnolomia guatemalensis* (B. L. Rob. & Greenm.) Greenm., Publ. Field Columbian Mus., Bot. Ser. 2:347. 1912. — *Hymenostephium guatemalense* (B. L. Rob. & Greenm.) S. F. Blake, Contr. Gray Herb. n.s. 54:8. 1918. — TYPE: Guatemala, Quiché, San Miguel Uspantán, 1825–3650 m, Apr 1892, E. T. Heyde and E. Lux s.n. (ed. J. Donnell Smith 3370) (GH).

Gymnolomia patens A. Gray var. *brachypoda* B. L. Rob. & Greenm., Proc. Boston Soc. Nat. Hist. 29:95. 1899. — SYNTYPES: Guatemala, Alta Verapaz, 1300 m, *H. von Tuerckheim s.n.* (ed. J. Donnell Smith 852) (GH) and Mexico, Colima, E. Palmer 1223 (GH; isosyntype: UC!).

Gymnolomia patens A. Gray var. *macrocephala* B. L. Rob. & Greenm., Proc. Boston Soc. Nat. Hist. 29:95. 1899. — TYPE: Venezuela, near Tovar, 1000 m, Fendler 686 (GH).

Aspilia hispida Brandegee, Univ. Calif. Publ. Bot. 4:94. 1910. — TYPE: Mexico, Puebla, Coxcatlán, 8000–9000 ft. [2440–2743 m], Sep 1909, C. A. Purpus 4126 (UC!; isotypes: FI, GH!).

Hymenostephium pilosulum S. F. Blake, J. Bot. 53:268. 1915. — TYPE: Mexico, Monte Alban, 1769 m, 3 Sep 1894, C. G. Pringle 4859 (K).

ILLUSTRATION: Fig. 57.

Coarse herbs or suffrutesces, sometimes shrubby clamberers, to 2(–4) m high; stems glabrous or piloso-hispid; leaves mostly opposite, the distal alternate, petioles 2–5(–50) mm long, sometimes narrowly winged distally, blades deltate-ovate to lance-ovate or lanceolate, triplinerved from near their bases, 5–15 cm long, 2–10 cm wide, bases cuneate to truncate or subcordate, margins dentate to serrate with callous teeth, apices acuminate to attenuate, faces subglabrous to strigose or scabrellous; heads in loose or congested, corymbiform clusters of 3–10, the clusters aggregated in leafy paniculiform associations; peduncles mostly 3–15(–30) mm long; involucre cylindro-campanulate, mostly 2–6 mm high; phyllaries 12–16, lance-ovate to lance-attenuate, the outer shorter, all basally somewhat striate-indurate, distally herbaceous, subglabrous to strigillose; receptacles slightly convex; paleae stramineous to greenish or blackish, scarious to cartilaginous, scarcely carinate, 3–4.5 mm long, abruptly acute or mucronate, subglabrous to closely strigillose; ray florets mostly 5–8, corollas pale to bright yellow, tubes 0.5–0.7 mm long, laminae ovate to oblong, 4–12(–15) mm long, sometimes bifid; disc florets ca. 20–50, corollas yellow, tubes 0.5–0.9 mm long, glabrous, throats slightly dilated, cylindrical 1.8–2.3 mm long, lobes lance-deltate, 0.5–0.6 mm long; style branches ca. 1 mm long, slightly attenuate, hispidulous;

cypselae blackish, subquadrate to laterally flattened, narrowly obovoid, 1.7–3.2 mm long, glabrous or sparsely hairy; pappi none or of 3–4, persistent or caducous, lacerate, free or connate squamellae 0.5(–1.5) mm long; $2n = ca. 102$.

Mostly in breaks in Tropical Rain, Montane Rain, Evergreen Cloud, Evergreen Seasonal, Tropical Deciduous, Pine-Oak-Liquidambar, and Pine-Oak forests; common on Central Plateau, in Central Depression, and in Sierra Madre, uncommon in Northern Highlands, in Eastern Highlands, and on Pacific Coastal Plain; 300–2100 m. Eastern and southern Mex. (Sin., S.L.P., Nay., Jal., Qro., Hgo., Cma., Mich., Méx., Pue., Ver., Gro., Oax., Chis.), Guat., Hond., Salv. Nic., C.R., Pan.; S.A. (Col., Ven.). CHIAPAS COLLECTIONS: *Cro* 64896 (UC); *Crq* 10495 (DS); *He* 359 (TEX); *He* 875 (TEX); *Luc* 2563 (TEX); *Lu* 17809 (CAS, LL); *Och* 4282 (CAS); *SC* 502 (CAS); *SI* 2147 (TEX); *SI* 2375 (TEX); *SI* 3085 (TEX); *Sund* 2382 (TEX); *T* 1892 (DS); *T* 2019 (DS); *T* 2211 (DS); 6406; 7999; 11031; 13441; 13922; 30216; 30328; 31009; 31204; 31563; 33914; 41666; 41704; 42436; 42875; 46205; 47659; 47915; 48012; 48617; 48703; 48870; 50669; 53821; 54155; 55473; 55765; 56259; 56297; 56819; 56907; 58516; 60171; 60369; 65568; 70330; 72634.

2. *Viguiera dentata* (Cav.) Spreng., Syst. 3:615. 1826.

— *Helianthus dentatus* Cav., Icon. 3:10, t. 220. 1795. — TYPE: Mexican plant cultivated in Madrid; no specimen seen; use of this name here is based on the illustration and tradition.

Helianthus triqueter Ortega, Nov. pl. descr. dec. 76. 1798. — *Viguiera triquetra* (Ortega) DC., Prodr. 5:579. 1836. — TYPE: Grown in Madrid from seed sent by Sessé from "Nova hispania"; no specimen seen.

Viguiera helianthoides Kunth, Nov. gen. sp., ed. fol. 4:177, t. 379. 1820 [1818]; ed. qto. 4:226. 1820. — [*Helianthus baillonianus* M. Gómez, Anales Soc. Esp. Hist. Nat. 19:273. 1890, nom. superfl.] — *Viguiera dentata* (Cav.) Spreng. var. *helianthoides* (Kunth) S. F. Blake, Contr. Gray Herb. n.s. 54:86. 1918. — TYPE: "Insula Cuba prope Havanum," A. J. A. Bonpland 1360 (P, microfiche!).

Viguiera brevipes DC., Prodr. 5:579. 1836. — *Viguiera laxa* DC. var. *brevipes* (DC.) A. Gray, Smithsonian Contr. Knowl. 3(5):108 (Pl. Wright.) 1852. — *Viguiera dentata* (Cav.) Spreng. var. *brevipes* (DC.) S. F. Blake, Contr. Gray Herb. n.s. 54:83. 1918. — TYPE: Texas, Bejar (Bexar), Sep 1828, J. L. Berlandier 1830 (1905) (G-DC, microfiche!; isotype: GH).

Viguiera sagraana DC., Prodr. 5:579. 1836. — [*Helianthus baillonianus* M. Gómez, Anales Soc. Esp. Hist. Nat. 19:273. 1890, nom. superfl.] — SYNTYPES: Cuba, Havana, 1831, R. de La Sagra "62" and 1833, R. de La Sagra "621" (G-DC, microfiche!).

Viguiera microcline DC., Prodr. 5:579. 1836. — *Helianthus microclinis* (DC.) M. Gómez, Anales Soc. Esp. Hist. Nat. 19:273. 1890. — SYNTYPES: Cuba, Havana, 1828, R. de La Sagra "13" and 1831, R. de La Sagra s.n. (G-DC, microfiche!).

Viguiera canescens DC., Prodr. 5:579. 1836. — *Viguiera dentata* (Cav.) Spreng. var. *canescens* (DC.) S. F. Blake, Contr. Gray Herb. n.s. 54:87. 1918. — TYPE: Mexico,

west of Guanajuato, 1829, *Mendez s.n.* (G-DC-3 sheets, microfiche!).

Viguiera laxa DC., Prodr. 5:580. 1836. — TYPE: Mexico, Tamaulipas, San Fernando to Santander, Oct 1830, *J. L. Berlandier* 1832 (2258) (G-DC — 2 sheets, microfiche!; isotypes: GH, K).

Viguiera oppositipes DC., Prodr. 5:579. 1836. — TYPE: Mexico, without specific locality or collector in 1826 (G-DC, microfiche!).

Viguiera texana Torr. & A. Gray, Fl. N. Amer. 2:318. 1842. — TYPE: Texas, without specific locality, *T. Drummond* III. 194 (GH; isotype: BM).

Helianthella latifolia Scheele, Linnaea 22:160. 1849. — TYPE: Texas, New Braunfels, "An Waldrändern," Oct 1846, *F. J. Lindheimer* III. 434 (unknown; isotypes: BM, GH, K, MO, US).

Helianthus baillonianus M. Gomez, Anales Soc. Esp. Hist. Nat. 19:273. 1890, nom. superfl. based on *Viguiera helianthoides* Kunth and *Viguiera sagraeana* DC.

Viguiera pedunculata Seaton, Proc. Amer. Acad. Arts 28:119. 1893. — TYPE: Mexico, Veracruz, near Esperanza, Mt. Orizaba, 8000 ft. [2440 m], 15 Aug 1891, *H. E. Seaton* 368 (GH).

Viguiera nelsonii B. L. Rob. & Greenm., Proc. Amer. Acad. Arts 32:45. 1896. — TYPE: Mexico, Guerrero, between Chilapa and Tixtla, 5200–7000 ft. [1586–2134 m], 17 Dec 1894, *E. W. Nelson* 2169 (GH).

Encelia montana Brandegee, Univ. Calif. Publ. Bot. 3:394. 1909. — TYPE: Mexico, Puebla, Cerro de Paxtle, near San Luis Tultitlanapa, 1908, *C. A. Purpus* 3103 (UC!; isotypes: BM, GH).

ILLUSTRATION: Fig. 58.

Perennials, herbaceous, mostly 1(–2) m high; stems glabrous or sparsely to densely pilose or canescent; leaves opposite proximally, alternate distally, petioles mostly 8–35 mm long, often narrowly winged, blades deltate to lance-deltate or lanceolate, triplinerved from near their bases, 3–9(–15+) cm long, 1–5(–12+) cm wide, bases subtruncate to cuneate, margins entire or serrate to dentate, rarely somewhat hastate, apices acute to acuminate, abaxial faces subglabrous to strigillose or densely piloso-canescens, adaxial faces finely to coarsely scabrellous or scabrous; heads borne singly or, more commonly, in loose, corymbiform or paniculiform associations; peduncles 2–6(–15) cm long, 0–2-bracteolate; involucre broadly campanulate to hemispheric; phyllaries mostly 12–16, in \pm 2 series, subequal, narrowly lance-acuminate to lance-linear or linear, 6–15 mm long, basally indurate, each with a medial glandlike ridge, all distally herbaceous, sparsely to densely strigillose to scabrellous, sometimes canescent; receptacles conical, ultimately 2–3 mm high, fistulose; paleae stramineous to blackish, cartilaginous to indurate, 6–8 mm long, carinate, ribbed, abruptly drawn to stout, pungent tips, glabrous or distally hairy; ray florets 8–12, corollas yellow, tubes ca. 1 mm long, laminae narrowly oblong to spatulate, mostly 8–25 mm long; disc florets ca. 100–180+, corollas yellow, tubes 0.9–1.4 mm long, pilosulous, throats abruptly dilated, cylindric, 1.4–2.1 mm long, sparsely pilosulous to hispidulous, at least at bases, lobes deltate to lance-deltate, 0.8–1.2 mm long; filaments flat, pubescent; style branches 1.2–1.6 mm long, hispidulous, deltoid-conic at tips; cypselas blackish, sometimes mottled, cuneiform in outline, somewhat flattened, 2.5–4 mm long, appressed pubescent

with straight, antrorse hairs; pappi of 4–6, lacerate to erose, persistent but fragile, squamellae, 2 drawn into aristae and 1.5–3 mm long, the rest exaristate and 0.5–1 mm long; $2n = 34$; flowering mostly Nov–Jan, Apr.

Mostly ruderal in Tropical Rain, Montane Rain, Evergreen Seasonal, Tropical Deciduous, Pine-Oak, and Palm forests; common throughout Central Depression, uncommon in Northern and Eastern highlands, on Central Plateau, and in W Sierra Madre; 180–2180 m. Widespread: southwestern United States (Ariz., N.M., Tex.), Mex. (Son., Chih., Coah., N.L., Sin., Dgo., Zac., S.L.P., Nay., Jal., Aguasc., Gto., Hgo., Cma., Mich., Méx., D.F., Mlos., Pue., Ver., Gro., Oax., Camp., Yuc., Chis.), Guat., Bel., Hond.; Cuba. CHIAPAS COLLECTIONS: *Brooks* 61-4 (TEX); *Ger* 1918 (CAS, UC); *Harr* 14664 (TEX); *RMK* 3038 (DS, TEX); *Lan* 752 (TEX); *Lan* 753 (TEX); *Lan* 780 (CAS, TEX); *Lan* 811 (TEX); *L* 3 (CAS); *L* 201 (DS); *L* 261 (DS); *L* 2793 (DS); *L* 2883 (DS); *Ma* Ch3 (RSA); *Mz* 8589 (TEX); *Mz* 10993 (TEX, UC); *Nee* 32310 (TEX, UC); *Neff* 93-4-9-2 (TEX); *EWN* 3477 (GH, US); *R&B* 20126 (DS); *S&S* 1922 (GH); *SI* 2106 (TEX); *SI* 2114B (TEX); *SI* 2162 (TEX); *SI* 2164 (TEX); *SI* 2178 (TEX); *T* 1887 (DS); *Vi* 400 (CAS, TEX); *Vi* 437 (TEX); *8399*; *21569*; *23336*; *24129*; *27835*; *33803*; *36539*; *41497*; *42118*; *42436*; *42872*; *46494*; *46962*; *47629*; *49065*; *49449*; *51015*; *55466*; *56872A*; *57963*.

3. *Viguiera ovata* (A. Gray) S. F. Blake, Contr. Gray Herb. n.s. 54:76. 1918.

— *Gymnolomia ovata* A. Gray, Proc. Amer. Acad. Arts 19:4. 1883. — TYPE: Mexico, probably Chiapas, "terre froide," forested slopes of mountains, Nov, *A. B. Ghiesbreght* "554" (GH).

Gymnolomia liebmanni Klatt, Leopoldina 23:90. 1887. — [*Microcephalum liebmanni* Schultz-Bip. ex Klatt, pro syn., loc. cit.] — TYPE: Mexico, "Meoatlan, S. Andres," *F. M. Liebmann* "588" (C).

ILLUSTRATION: none found.

Perennials, herbaceous, mostly 3–7 dm high; stems pilosohispid; leaves mostly opposite, petioles 1–3 mm long, blades deltate-ovate, triplinerved, 25–50 mm long, 15–40 mm wide, bases subcordate to broadly cuneate, margins serrate to crenate, apices obtuse to acute, abaxial faces pilose, adaxial faces more strigillose; heads in loose corymbiform or paniculiform associations; peduncles slender, mostly 1–6 cm long, 0–2-bracteate, pilose and granular-glandular-pubescent; involucre campanulate to hemispheric; phyllaries mostly 20–26 in 2–3 series, graduate, dark green to blackish, lanceolate to linear, 3–7 mm long, herbaceous to cartilaginous, closely granular-pubescent and sparsely pilose; receptacles convex; paleae proximally stramineous and chartaceous, distally dark green and cartilaginous, 6–7 mm long, minutely carinate, weakly trifid at pungent apices, distally closely granular-puberulent and hispidulous; ray florets mostly 8+, corollas pale yellow, drying to ochroleucous with 5–6 dark nerves, tubes ca. 1 mm long, laminae narrowly oblong, mostly 5–8 mm long; disc florets 25–50, corollas pale yellow, often purplish distally, tubes ca. 0.5 mm long, hispidulous and glandular-puberulent, somewhat thickened at bases and clasping tops of ovaries, throats moderately dilated, cylindric-funnelform, ca. 2.5 mm long, antrorsely closely strigillose at bases and on nerves, lobes lance-deltate, ca. 1 mm long, abaxially hispidulous, adaxially papillate; fila-

ments flat, glabrous; style branches ca. 1.5 mm long, hispidulous, attenuate; cypselae blackish, somewhat flattened laterally, oblong-obovate in outline, ca. 3 mm long, glabrous, minutely striate; pappi none.

Shrubby slopes in Pine-Oak Forest; uncommon in Eastern Highlands and on Central Plateau; 1500–2500 m. Southern Mex. (Oax., Chis.). CHIAPAS COLLECTIONS: *G* "554" (GH); *SR* 221 (CAS, TEX); 13292; 37858; 40684; 40979; 46029; 46065; 46401; 53097; 54859.

This and some other species now usually treated in *Viguiera* ser. *Grammatoglossae* S. F. Blake (1918) may be congeneric with species usually assigned to *Simsia*.

4. *Viguiera puruana* Paray, Bol. Soc. Bot. Mexico 22:4. 1958.

— TYPE: Mexico, Michoacán, "en rocas de lava arriba de la barranca de San José de Purúa," 27 Nov 1955, *L. Paray* 1780 (MEXU).

Viguiera blakei McVaugh, Contr. Univ. Michigan Herb. 9:454. 1972. — TYPE: Mexico, Michoacán, 16–18 km SE of Aserradero Dos Aguas, nearly W of Aguillilla, 1400–1500 m, 26 Nov. 1970, *R. McVaugh* 24722 (MICH). ILLUSTRATIONS: Bol. Soc. Bot. Mexico 22:5. 1958; Contr. Univ. Michigan Herb. 9:454. 1972; Syst. Bot. 13:401. 1988.

Trees, to 15 m high; leaves opposite, petioles 3–6+ cm long with strongly undulate wings, blades broadly ovate to subrotund, 12–20+ cm long, 8–18+ cm wide, bases broadly cuneate to subtruncate, margins crenate-serrate or entire, apices acuminate, abaxial faces pilosulous with ± crisped hairs, adaxial faces more piloso-scabrellous, both faces minutely resinous-gland-dotted; heads ca. 12 in corymbiform or panicleform associations; peduncles 1–7 cm long; involucre subhemispheric; phyllaries ca. 24–30, graduated, the outer lanceolate, 5–10 mm long, the inner lance-attenuate, 8–13 mm long, all proximally slightly indurate, more herbaceous and recurved distally, closely pilosulous with crisped hairs; receptacles slightly convex; paleae greenish, scarioso-chartaceous, 10–12 mm long, hyaline-margined distally, abruptly pungent, pubescence similar to that of phyllaries; ray florets ca. 11–15, corollas yellow, tubes very slender, ca. 2 mm long, laminae narrowly spatulate to oblong, 25–35 mm long; disc florets ca. 120–150, corollas yellow, tubes cylindric, ca. 1.6 mm long, glabrous, throats narrowly funnelform-obconic, ca. 3.5 mm long, proximally subglabrous, distally closely appressed-puberulent, lobes lance-linear, ca. 2 mm long, abaxially appressed-puberulent, adaxially papillate at margins; filaments flattened, glabrous; style branches ca. 3 mm long, abruptly acute; cypselae (immature) reddish brown, flattened, narrowly cuneiform, ca. 4 mm long, glabrous but for very short hairs around their tops; pappi persistent, of 4(+?), cartilaginous squamellae: 2 lanceolate to lance-ovate, ca. 6 mm long plus 2 lance-triangular, sometimes lacerate, 1–2 mm long; $2n = 34$.

Steep slopes in Evergreen Cloud and Evergreen Seasonal forests; uncommon in SE Sierra Madre; 1300–2000 m. Scattered in southern Mex. (Mich., Méx., Gro., Chis.). CHIAPAS COLLECTIONS: 42630; 47663.

My description is based on Chiapan plants. Measurements for floral details in plants from the trans-volcanic mountains (McVaugh 1972) average significantly greater than those given here. The Chiapan plants may prove to be specifically distinct from *V. puruana*.

5. *Viguiera tenuis* A. Gray, Proc. Amer. Acad. Arts 22:426. 1887.

— TYPE: Mexico, Jalisco, Río Blanco, Oct 1886, *E. Palmer* "657" (GH; isotypes: BM, K, MO).

Viguiera tenuis A. Gray var. *alba* Rose, Contr. U.S. Natl. Herb. 1:336. 1895. — *Viguiera tenuis* A. Gray f. *alba* (Rose) S. F. Blake, Contr. Gray Herb. n.s. 54:105. 1918.

— TYPE: Mexico, Colima, Colima, 9 Jan–6 Feb 1891, *E. Palmer* "1151" (US; isotypes: BM, GH, K, MO, UC).

ILLUSTRATION: none found.

Annuals, erect, mostly 2–4 dm high, openly branched distally; leaves opposite, sessile or nearly so, blades narrowly lanceolate to lance-ovate, triplinerved from near their bases, 25–50(–75) mm long, 8–12(–22) mm wide, bases truncate to cordate, margins entire to remotely serrate, apices acute to sub-attenuate, both faces sparsely to densely strigoso-hirsute with white hairs; peduncles 6–10(4–15) cm long, very slender, 0–3 bracteolate; involucre campanulate to hemispheric, 4–7 mm high; phyllaries ca. 24–30 in 2–3 series, the outer linear, 1–3 mm long, the inner lance-linear, 3–7 mm long, weakly carinate, medially strigose, most abruptly acuminate; receptacles slightly convex; paleae scarioso-chartaceous, navicular, 5–7 mm long, weakly carinate, medially strigose, mostly abruptly acuminate; ray florets none [8–12, corollas yellow or white, tubes ca. 2 mm long, laminae narrowly ovate, 5–8 mm long]; disc florets mostly 20–80, corollas pale to bright yellow, 4.5–5 mm long, tubes ca. 0.8 mm long, glabrous, throats very slightly ampliate, very narrowly funnelform to cylindric, 4–4.5 mm long, minutely scabrellous, at least proximally, lobes deltate to ovate, erect or patent, ca. 0.5 mm long, abaxially hirsutulous, adaxially papillate; style branches ca. 1.5 mm long, attenuate, minutely hispidulous; cypselae blackish, plumply obovoid, weakly laterally compressed, ca. 2 mm long; sericeo-hirsutulous; pappi of 2 caducous, subulate squamellae 4–5 mm long plus 4–5, more persistent, ovate to cuneate, distally erose-fimbriate squamellae 1–1.5 mm long; $2n = 24$.

Open slopes in Evergreen Seasonal and Pine-Oak forests; uncommon in Sierra Madre; 900–1100 m. Scattered through western and southern Mex. (Sin., Dgo., Jal., Cma., Mich., Méx., Mlos., Gro., Oax., Chis.), C.R., Pan. CHIAPAS COLLECTIONS: 46544; 48603; 54560.

The Chiapan plants are unusual in being discoid.

77. WAMALCHITAMIA

Wamalchitamia Strother, Syst. Bot. Monogr. 33:30. 1991. — TYPE: *Zexmenia aurantiaca* Klatt = *Wamalchitamia aurantiaca* (Klatt) Strother.

Shrubs, 5–20+ dm tall (reported to be trees to 6 m in *W. aurantiaca*); leaves opposite, petiolate or sessile, petioles narrowly, if at all, margined, not manifestly winged, blades mostly ovate to lanceolate, triplinerved from near or well above their bases, mostly 5–15 cm long, bases rounded to cuneate, margins serrate or denticulate, apices acute to long-attenuate, abaxial faces pilose or hirsute to strigillose, sometimes also with stipitate-glandular hairs, adaxial faces scabrellous to strigillose; heads borne singly or in 2s or 3s, held within to well beyond the foliage; peduncles ebracteate; involucre broadly campanulate to cylindric, mostly 7–13 mm high, excluding the sometimes longer outer phyllaries, truncate at bases; phyllaries 15–30 in 2–3+ series, the outer 3–5 phyllaries longer, cartilaginous to indurate at bases with erect or spreading, herbaceous tips, the inner ovate to lanceolate, more chartaceous to scarious or membranous; receptacles flat to slightly convex; paleae persistent, stramineous to purplish, conduplicate, navicular, lance-linear in outline, shorter than the disc florets at anthesis, chartaceous to scarious, carinate-nerved, distally trifid, the middle lobe spatulate to subulate; ray florets 7–15, pistillate, fertile, corollas yellow to orange or red-orange, tubes cylindric, laminae ovate or elliptic to narrowly oblong with 2–3 teeth; disc florets 20–60, bisexual, fertile, corollas yellow to orange, tubes dilated at bases with thick-walled cells, narrowly cylindric, shorter than to about equalling the funnelliform throats, lobes 5, narrowly deltate, minutely papillate on adaxial margins; anther thecae usually black or blackish, sometimes reddish brown, anther appendages stramineous, erect, usually narrowly deltate, sometimes attenuate; style branches slender, hispidulous, deltate-attenuate beyond the 2 stigmatic lines; cypselae dark reddish brown to blackish, sometimes with fuscous to stramineous or rufous tuberculae on the faces, prismatic, 3–4(–5)-angled, narrowly cuneate to linear in outline, not winged, obliquely inserted onto bosses on the receptacles, carpodia very small, lunate, elaiosomes none; pappi of 1–5, unequal, fragile or persistent awns from dilated bases plus 0–6+, much shorter, hispidulous, free or strongly connate, squamellae, all inserted directly on \pm truncate apices of the cypselae bodies, not raised on rostra; $x = ca. 100(?)$.

Species 5; southern Mexico (Isthmus of Tehuantepec) to Costa Rica.

- a. Outer phyllaries mostly broadly lanceolate or oblanceolate, erect, the largest 9–18+ mm long, 3–7 mm wide 3. *W. dionysi*
- aa. Outer phyllaries narrowly triangular to linear, or lanceolate, usually with spreading tips, the largest 7–13 mm long, 1–2(–3+) mm wide.
 - b. Leaf blades broadly ovate-elliptic to lanceolate, adaxial indument pilose or scabrellous to strigillose; laminae of ray corollas 6–12(–15) mm long 2. *W. aurantiaca*
 - bb. Leaf blades lanceolate, often falcate, adaxial indument of appressed hairs; laminae of ray corollas 25–35 mm long 1. *W. appressipila*

1. *Wamalchitamia appressipila* (S. F. Blake) Strother, Syst. Bot. Monogr. 33:34. 1991.

— *Zexmenia appressipila* S. F. Blake, J. Wash. Acad. Sci. 33:269. 1943. — TYPE: Mexico, Chiapas, Mt. Ovando, in pineland, 14–18 Nov 1939, *E. Matuda 3954* (NA, now in US!; isotypes: F!, MICH!, MO!).

ILLUSTRATION: none found.

Shrubs, to 5+ dm tall; petioles 2–8 mm long, leaf blades lanceolate, often falcate, 7–12(–18) cm long, 18–25(–50) mm wide, bases narrowly cuneate to rounded, margins minutely revolute and obscurely denticulate, apices long-attenuate, abaxial faces with appressed hairs 0.1–0.5 mm long, adaxial indument similar, somewhat coarser; peduncles 3–4 cm long, the heads held within the foliage; involucre subcylindric, 10–13 mm high; phyllaries 26–30, the outer lance-linear, 1–2(–3+) mm wide, distally herbaceous, indument as on leaves, the inner more ovate to lanceolate, more chartaceous with herbaceous tips or wholly scarious to membranous, the innermost shorter than the outer; paleae 10–12 mm long; ray florets 12–13, corollas yellow to orange, tubes 2.5–3 mm long, laminae narrowly oblong, 25–35 mm long; disc florets 30–50, corollas yellow to orange, tubes 1.5–2.5 mm long, throats 4.5–5 mm

long, lobes 1–1.5 mm long; cypselae blackish, 4.5–5.5 mm long; pappi of 1–3, unequal awns 2–5 mm long plus 2–6+, connate squamellae 0.5–1 mm long; flowering Nov.

Chiapas endemic: uncommon in Sierra Madre; ca. 1250 m. CHIAPAS COLLECTIONS: *He 1112* (TEX); *EM 3954* (F, MICH, MO, US); *EM s.n.* (F).

2. *Wamalchitamia aurantiaca* (Klatt) Strother, Syst. Bot. Monogr. 33: 32. 1991.

— *Zexmenia aurantiaca* Klatt, Bull. Soc. Roy. Bot. Belgique 35: 296. 1896. — TYPE: Costa Rica, San José, Río Virilla, 1100 m, Dec 1895, *A. Tondus 9836* [ed. J. Donnell Smith 7071] (GH!; isotypes: GH! F! MO! NY! US!).

Zexmenia melastomacea S. F. Blake, J. Wash. Acad. Sci. 19:274. 1929. — TYPE: Honduras, Comayagua, vicinity of Siguatepeque, 1080–1400 m, 14–27 Feb 1928, *P. C. Standley 56389* (US!; isotypes: A! F!).

Zexmenia perymenoides S. F. Blake, Field Mus. Nat. Hist., Bot. Ser. 17:405, pl. 18. 1938. — TYPE: Honduras, Comayagua, near El Achote above the plains of Siguatepeque, 1350 m, 26 Jul 1936, *T. G. Yuncker et al. 6099* (US!; isotype: GH! MO! NY!).

Zexmenia valerii Standl. & Steyerl., Ceiba 1:168. 1950. —
TYPE: Honduras, El Paraíso, Las Casitas, 950 m, 4 Dec
1946, P. C. Standley et al. 623 (F!; isotype: EAP).

Zexmenia cholutecana A. Molina, Ceiba 16:55. 1970. —
TYPE: Honduras, Choluteca, between El Chinchayote and
Comalí, 1000 m, 9 Nov 1969, A. Molina 24587 (EAP;
isotypes: F! MICH! US!).

ILLUSTRATION: none found.

Shrubs, mostly 5–20+ dm tall, sometimes clambering or only
basally woody; petioles 3–15(–35) mm long, leaf blades
broadly ovate-elliptic to lanceolate, 5–9(–15) cm long, 2–5(–7)
cm wide, bases rounded to broadly or narrowly cuneate, margins
serrate, apices attenuate, abaxial faces pilose or scabrellous
to appressed-strigillose with hairs 0.2–1 mm long, adaxial in-
dument similar but coarser; peduncles 3–8(–16) cm long, the
heads held not at all to slightly or well beyond the foliage;
involucres subcylindric, (7–)9–12 mm high; phyllaries
(20–)24–30, the outer lance-linear to lanceolate, 1–2(–3+) mm
wide, distally herbaceous with spreading tips, usually strigil-
lose, the inner more ovate to lanceolate, more chartaceous with
erect, herbaceous tips or wholly scarious to membranous, the
innermost shorter than the outer, intergrading with the paleae;
paleae 8–12 mm long; ray florets 8–14, corollas yellow to
orange or red-orange, tubes 2–3 mm long, laminae narrowly to
broadly oval-elliptic, (6–)12–15 mm long; disc florets 20–50+,
corollas yellow to orange, tubes 2–3.5 mm long, throats 4–5
mm long, lobes 1–1.5 mm long; cypselae dark reddish brown
and usually with fuscous to stramineous tuberculae, 3–5 mm
long; pappi of 1–3, unequal, fragile or persistent awns 2–5(–7)
mm long plus (0–)2–6+, connate squamellae 0.5–1.5 mm long;
flowering mostly Aug–Nov.

Mostly moist streambanks and rocky slopes in otherwise dry
Tropical Deciduous and Pine-Oak forests; exceptionally in
wetter Pine-Oak-Liquidambar Forest; uncommon in Northern
Highlands and on Central Plateau; 800–1200(–1600) m. South-
ern Mex. (Chis.), Hond., Nic., C.R. CHIAPAS COLLEC-
TIONS: 11844; 27601; 46755; 47913; 48029; 48172; 51980;
53799.

3. *Wamalchitamia dionysi* Strother, Syst. Bot. Monogr. 33:35. 1991.

— TYPE: Mexico, Chiapas, ca. 6 km south of La Trinitaria
on route 190, 1350 m, 26 Oct 1980, D. E. Breedlove 46961
(CAS!; isotypes: BM!, MEXU!, MO!, NY!).

ILLUSTRATION: none found.

Shrubs, 1–2 m tall; petioles 6–15 mm long; leaf blades
broadly ovate-elliptic to lanceolate, 5–15 cm long, 2–7 cm
wide, bases rounded or broadly to narrowly cuneate, margins
finely serrate or denticulate, apices attenuate, abaxial faces
pilose-hirsute with fine, erect hairs 0.4–1 mm long, adaxial
indument more scabrous with coarser hairs; peduncles 5–20
mm long, to 9 cm in fruit, the heads held well within the foliage
at anthesis; involucres subcylindric to campanulate, 9–18+ mm
high; phyllaries 20–24+, the outer broadly lanceolate to
oblanceolate, 3–7 mm wide, distally herbaceous with erect tips,
usually strigillose, the inner shorter, more ovate to lanceolate,
more chartaceous with erect, scarious or membranous tips;
paleae 8–13 mm long; ray florets 8–15, corollas yellow to
orange, tubes 2–3 mm long, laminae narrowly to broadly oval-
elliptic, 10–22 mm long; disc florets mostly 25–60+, corollas
yellow to orange, tubes 2.5–4 mm long, throats 4.5–5 mm long,
lobes 1–1.2 mm long; cypselae pale to dark reddish brown to
blackish, usually with dark, rufous to lighter, stramineous tu-
berculae, 4–6 mm long; pappi of 1–3, unequal, persistent or
fragile, aristate squamellae or awns 3–7 mm long plus (0–)
2–6+, shorter, connate squamellae 0.5–1.5 mm long; $2n = ca.$
178–192, ca. 204–216; flowering mostly Sep–Dec.

Chiapas endemic: usually in thickets along streambanks in
Evergreen Seasonal and Tropical Deciduous forests, sometimes
in Pine-Oak Forest; uncommon on E Central Plateau and in
adjacent Central Depression and Eastern Highlands; 750–1700
m. CHIAPAS COLLECTIONS: 37897; 42206; 42343; 46070;
46424; 46961; 48899; 53125; 53627; 53745; 55068; 69792.

78. WEDELIA

Wedelia Jacq., Enum. syst. pl. 8, 28. 1760; Sel. stirp. amer. hist. 217, t. 130. 1763, nom. conserv. — *Wedelia* Jacq. sect.
Cyathophora DC., Prodr. 5:538. 1836, nom. superfl. — *Seruneum* Rumph. ex Kuntze, Revis. gen. pl. 1:364. 1891, nom.
superfl. — TYPE: *Wedelia fruticosa* Jacquin.

Stemmodontia Cass., Bull. Sci. Soc. Philom. Paris 1817:11. 1817. — TYPE: *Stemmodontia scaberrima* Cass. [From Cassini's
descriptions of genus and species, it is clear that he had in hand a plant or plants referable to the circumscription of
Wedelia here adopted; alas, the name *S. scaberrima* cannot be confidently associated with any particular taxon of *Wedelia*.]
Lipochaeta DC. sect. *Catomenia* Torr. & A. Gray, Fl. N. Amer. 2:357. 1842. — TYPE: *Lipochaeta texana* Torr. & A. Gray
[= *Wedelia acapulcensis* var. *hispida* (Kunth) Strother]

Mostly erect, sometimes clambering, lax, or prostrate, herbaceous or basally woody, perennials (one species annual), or
shrubs, 1–10(–25+) dm tall, rarely rooting at proximal nodes; leaves opposite, petiolate or sessile, blades deltate, trullate, ovate,
elliptic, lanceolate, oblanceolate, lance-linear, or linear, sometimes weakly to decidedly 3-lobed, triplinerved from at or near
their bases, margins entire or lacerate, dentate, or serrate, sometimes strongly revolute, faces scabrous to scabrellous, strigoso-
hispid, strigillose, or subsericeous, often with finer, uncinat hairs and/or (rarely) minutely stipitate-glandular and dotted with
resin globules; heads borne singly or in open, loose (rarely compact) dichasiiform associations of 2–3(–8) at the ends of primary
fruit; involucres obconic, narrowly to broadly campanulate, or hemispheric, 4–15 mm high excluding the sometimes longer,
outermost 2–5 phyllaries, rounded to truncate or dimpled at their bases; phyllaries 8–16(–22) in 2–3+ series, graduated to
subequal, the outer 2–5 usually \pm herbaceous, sometimes longer than the rest, the inner more chartaceous to scarious or
membranous, often ciliate; receptacles slightly to strongly convex; paleae persistent, not basally connate, conduplicate, navicular,

usually carinate, shorter than or equalling the disc florets at anthesis, chartaceous to scarious; ray florets 4–18 (rarely none), pistillate and fertile, or neuter, corollas yellow to orange, red, or white, laminae oval, oblong, elliptic, or orbicular with 2–3 teeth; disc florets 8–150+, bisexual, fertile, corollas yellow to orange or ochroleucous, sometimes marked with purple, tubes narrowly cylindric, shorter than to about equalling the narrowly funnelform to cylindric-funnelform throats, lobes 5, deltate to lance-deltate; anther thecae stramineous or, more commonly, dark brown, the appendages mostly stramineous, deltate to narrowly deltate, erect; style branches slender, usually hispidulous, attenuate beyond the 2 stigmatic lines; cypselae stramineous to grayish, dark brown, or blackish, often marked with rufous or purplish dots or streaks, sometimes with thick, corky, smooth or slightly tuberculate epidermes, bodies of the cypselae oblong, obovate, pyriform, or cuneate, the peripheral (ray and outer disc) usually triquetrous, winged or not, the inner biconvex-flattened to quadrate, winged or not, all cypselae patently inserted on receptacles or nearly so, carpodia conspicuous, shiny, comprising (1–)2 distinct plates, some or all cypselae in a head bearing a whitish or translucent elaiosome on one or both faces at their bases, wings usually thin, narrow to nearly as broad as the body, extending from rostrum or upper shoulder to base or cypselae merely auriculate on upper shoulders; pappi separated from the bodies of the cypselae by stout to slender rostra 0.2–1.2 mm high; pappi erose, fimbriate, or lacerate cups or coronas plus 0–3 slender, unequal, persistent (rarely fragile), bristles or awns; x = unclear (11, 12, 13, 23?).

Some 20 species of *Wedelia* are found in continental North America; they grow in central Texas, over much of Mexico, and almost throughout Central America. Additional species of *Wedelia* are found in Antilles and South America. Some, perhaps all, African species named in *Aspilia* Thouars may also belong within my circumscription of *Wedelia*.

- a. Ray florets neuter, their corollas usually reddish, sometimes purple or coppery orange; cypselae mostly pyriform or plumply biconvex, not quadrate in cross section, little, if at all, winged 3. *W. purpurea*
- aa. Ray florets pistillate, their corollas not red to purple; cypselae mostly oblong to cuneate, rarely pyriform, the outer usually triquetrous, the inner quadrate or biconvex to biconvex-flattened in cross section, usually some or all winged (except *W. acapulcensis* var. *parviceps* with involucre 4–6 mm high).
 - b. Annuals, proximal branches patent, then arcuate, ascending; ray corollas often white (at least the adaxial surfaces) 2. *W. iners*
 - bb. Perennials or, if functionally annuals, proximal branches divergent, \pm antrorse, not patent and then arcuate; ray corollas uniformly yellow or orange 1. *W. acapulcensis*

1. *Wedelia acapulcensis* Kunth, Nov. gen. sp., ed. fol. 4:168. 1820 [1818]; ed. qto. 4:215. 1820.

— *Serunium acapulcensis* (Kunth) Kuntze, Revis. gen. pl. 1:365. 1891. — TYPE: Mexico, Guerrero, Acapulco, A. von Humboldt and A. J. A. Bonpland s.n. (P-HBK, microfiche!).

Erect to lax, rarely somewhat vinelike, coarse and robust to gracile, basally woody, perennials or shrubs, 2–25 dm tall, stems maculate or not, proximal branches usually \pm antrorse; petioles narrowly winged, 2–15+ mm long, leaf blades broadly rounded-deltate, trullate, ovate, lanceolate, lance-elliptic, or nearly lance-linear, sometimes obscurely to decidedly 3-lobed, mostly 3–8(–15) cm long, (5–)15–80 mm wide, lengths mostly 2.5–4 times widths, bases usually broadly to narrowly cuneate, sometimes rounded to truncate, margins entire or, more often, proximally entire and distally sublacerate or coarsely toothed to serrate, apices acute or acuminate, abaxial faces scabrous or strigoso-hispid, especially along nerves, the longer hairs 0.5–1.5 mm long, and sparsely to densely pubescent with finer, more erect hairs 0.2–0.8 mm long, the finer hairs uncinatate or not, the surface sometimes also minutely stipitate-glandular, adaxial faces with longer and coarser hairs, none, or fewer, uncinatate; peduncles 1–30+ cm long at anthesis, somewhat to much longer in fruit; involucre obconic or narrowly to broadly campanulate, 4–14 mm high, becoming broadly campanulate to hemispheric and larger in fruit; phyllaries 8–15(–20), graduated to subequal, the outer deltate, oblong, lance-ovate, lance-linear, or spatulate, often cartilaginous proximally and with purplish

nerves, distally herbaceous with straight or recurved tips, abaxially scabrellous or strigoso-hispid with hairs to 1+ mm long and with finer, usually closely appressed, rarely uncinatate, hairs 0.1–0.5 mm long, the inner phyllaries more scarious to membranous, usually somewhat shorter and broader, more oval, less scabrid, more ciliolate; paleae stramineous, often each with a purplish nerve, or purplish throughout, chartaceous to scarious, (4.5–)6–9+ mm long; ray florets 5–15 (rarely wanting), pistillate, fertile, corollas yellow to orange, tubes 1.5–2.5 mm long, laminae ovate to oval or orbicular, 3–15 mm long; disc florets (8–)20–80, corollas yellow to orange, sometimes marked with purple, tubes 0.9–3 mm long, throats ampliate, narrowly funnelform or cylindric-funnelform, 1.5–3.5 mm long, lobes deltate to lance-deltate, 0.4–1.2 mm long, often abaxially hispidulous and thickened at tips with basally dilated hairs, adaxially papillate along margins; cypselae stramineous to purplish brown, gray, or blackish, often mottled or streaked, the peripheral cypselae pyriform to obovoid, or oblong, narrowly obovate, or cuneate in outline, often triquetrous, usually 2–3-winged (often wingless in var. *parviceps*), 3–6 mm long, 2.5–4 mm wide, including wings, mostly glabrous, the inner cypselae usually more biconvex to flattened, oblong or cuneate in outline, (0–)2-winged, 2.5–7 mm long, 1.5–4 mm wide, including wings (if any), the faces glabrous or antrorsely hispid with hairs 0.1–1 mm long, rostra 0.1–1.3 mm high; pappi fimbriate to lacerate cups ca. 0.1–1 mm high plus 0–3 fragile to persistent bristles or unequal awns to 5 mm long; $2n$ = ca. 22, 26, 46, ca. 52.

Wide ranging over much of eastern and southern Mexico and through northern Central America into Costa Rica (see distributions for ranges of individual varieties).

The varieties of *W. acapulcensis* are markedly distinct over considerable geographic areas. The distinctions often break down to greater or lesser degrees for

specimens from areas where distributions of two varieties abut or overlap.

- a. Abaxial faces of leaves with all hairs straight-tipped, none uncinata (as seen at ca. 20×)
..... 1e. *W. acapulcensis* var. *tehuantepecana*
- aa. Abaxial faces of leaves with a mixture of relatively coarse, straight-tipped and finer, uncinata hairs (as seen at ca. 20×).
 - b. Leaf blades mostly entire, subentire, or finely and remotely serrate; peduncles 5–40(–115) mm long; cypselae mostly pyriform or obovoid.
 - c. Involucres 6–10(–14) mm high, outer phyllaries often attenuate, somewhat spreading
..... 1d. *W. acapulcensis* var. *ramosissima*
 - cc. Involucres 4–6 mm high, outer phyllaries acute, mostly appressed 1c. *W. acapulcensis* var. *parviceps*
 - bb. Leaf blades mostly serrate or coarsely toothed, at least distally; peduncles mostly 5–12+ cm long (shorter in var. *cintalapa*); cypselae mostly flattened, oblong to cuneate in outline.
 - d. Involucres 4–6 mm high; ray florets 5–6; disc florets 12–20 1b. *W. acapulcensis* var. *cintalapana*
 - dd. Involucres 5–10(–12+) mm high; ray florets 5–8(–13); disc florets 15–60+
..... 1a. *W. acapulcensis* var. *acapulcensis*

1a. *Wedelia acapulcensis* Kunth var. *acapulcensis*.

Zexmenia longipes Benth., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 4: 95. 1852. — TYPE: Costa Rica, Volcán El Viejo, 1851, *A. S. Oersted s.n.* (K!; photograph and fragments ex K in US!; No. 8520 in photograph ex C in F!).

Zexmenia epapposa M. E. Jones, Contr. W. Bot. 15:155. 1929. — TYPE: Mexico, Nayarit, Acaponeta, Tiger Mine, 1 Mar 1927, *M. E. Jones 23394* (POM!; isotypes: MO! UC!).

Zexmenia pinetorum Standl. & Steyer., Publ. Field Mus. Nat. Hist. Bot Ser. 23(3):149. 1944. — *Wedelia pinetorum* (Standl. & Steyer.) K. Becker, Phytologia 31:149. 1975. — TYPE: Guatemala, Jutiapa, between Jutiapa and Plan de Urrutia, 900–1200 m, 28 Oct 1940, *P. C. Standley 75590* (F!).

ILLUSTRATION: Fig. 59.

Perennials, erect to lax, often woody at base or shrubby, stems 2–8(–20+) dm long; leaves subsessile or with winged petioles 3–10 mm long, blades broadly rounded-deltate or rhombic to narrowly lanceolate or lance-linear, sometimes obscurely 3-lobed, 3–5(–12) cm long, 5–30(–80) mm wide, margins usually proximally entire, distally unevenly serrate, abaxial faces scabrous to strigoso-hispid with hairs 1–1.5 mm long and pubescent with fine, erect, uncinata hairs 0.1–0.3 mm long, adaxial faces more strongly scabrous and with fewer or no uncinata hairs; peduncles 2–8(–12+) cm long at anthesis; involucres 5–10(–12+) mm high; phyllaries 10–12(–18); paleae 5–8 mm long; ray florets 5–8(–13), laminae 4–8(–10+) mm long; disc florets (15–)25–60+; cypselae flattened, oblong to cuneate in outline, 3–5 mm long, the peripheral triquetrous, usually 2–3-winged, the inner biconvex to obscurely quadrate in cross section, 2-winged, rostra straight, stout, 0.2–0.6 mm high; pappi to 3+ mm long; 2*n* = 26; flowering mostly Jul–Jan.

In thickets and borders of clearings, often along streams, sometimes ruderal, in Evergreen Seasonal, Tropical Deciduous, and Pine-Oak forests; common on SE Central Plateau and in adjacent Northern Highlands, Eastern Highlands, and Central Depression, rare in SE Sierra Madre; 1100–1800(700–2100) m.

Western and southern Mex. (Sin., Nay., Jal., Mich., Méx., Gro., Chis.), Guat., Hond., Salv., Nic., C.R. CHIAPAS COLLECTIONS: *Crq 10480* (DS, MICH, TEX); *RMK 3041* (MICH, TEX, UC); *L 2422* (DS, F); *Prat 1102* (TEX); *O. Téllez 6955* (MO); *13233*; *37865*; *40483*; *41127*; *42252*; *46056*; *46336*; *46382*; *46392*; *46430*; *46431*; *46766*; *46787*; *51667*; *53085*; *53257*; *53629*; *53786*; *54639*; *54779*; *70620*.

Plants of *D. E. Breedlove 28669* (Chiapas, 27 km NE of Huixtla, SW of Tolimán on road to Motozintla) are intermediate between *W. acapulcensis* var. *acapulcensis* and var. *ramosissima*.

1b. *Wedelia acapulcensis* Kunth var. *cintalapana* Strother, Syst. Bot. Monogr. 33:54. 1991.

— TYPE: Mexico, Chiapas, Cintalapa, 12 km S of route 190 near Rizo de Oro and microwave station of La Mina, 1000 m, 16 Oct 1971, *D. E. Breedlove 20532* (DS!; isotypes: MICH! MO!).

ILLUSTRATION: none found.

Erect, basally woody, perennials or shrubs, 3–8+ dm high; leaves subsessile or with winged petioles to 8 mm long, blades lanceolate to lance-ovate, sometimes obscurely 3-lobed, 2–5 cm long, 6–16 mm wide, margins entire or serrate, abaxial faces scabrelous with hairs 0.5–1 mm long and pubescent with fine, uncinata hairs 0.1–0.3 mm long, adaxial faces more strongly scabrous and with fewer or no uncinata hairs; peduncles 1–3(–5) cm long; involucres 4–6 mm high; phyllaries 9–12; paleae 5–6.5 mm long; ray florets 5–6, laminae 4–5 mm long; disc florets 12–20; cypselae flattened, oblong to cuneate in outline, 3–4.5 mm long, the peripheral triquetrous, 2–3-winged, the inner biconvex to weakly quadrate in cross section, 2-winged, rostra straight, 0.2–0.5 mm high; pappi to 1–2 mm long; flowering Jun and Sep–Nov.

Chiapas endemic: openings in Evergreen Seasonal and Pine-Oak forests; uncommon at interface of Central Depression and NW Sierra Madre; 850–1100 m. CHIAPAS COLLECTIONS: *20532* (type); *48025*; *48098*; *51126*; *52709*.

1c. *Wedelia acapulcensis* Kunth var. *parviceps* (S. F. Blake) Strother, Syst. Bot. Monogr. 33:58. 1991.

— *Wedelia parviceps* S. F. Blake, Contr. U.S. Natl. Herb. 24:28. pl. 9. 1922. — TYPE: Guatemala, Zacapán, Gualán, 26 May 1919, S. F. Blake 7681 (US!).

ILLUSTRATION: Contr. U.S. Natl. Herb. 24:pl. 9. 1922.

Erect, herbaceous or basally woody, perennials or shrubs, 2–8 (–25) dm high; leaves with narrowly winged petioles 3–5 (–12) mm long, blades ovate to narrowly lanceolate, 15–35 (–55) mm long, 6–12 (–25) mm wide, margins entire or subentire to remotely serrate, abaxial faces scabrellous with hairs 0.3–0.8 mm long and with finer, erect, uncinat hairs, sometimes minutely stipitate-glandular, adaxial faces scabrellous-hispid and usually with fewer or no uncinat hairs; peduncles 5–40 mm long at anthesis; involucre 4–6 mm high; phyllaries 12–15, the outer acute, mostly appressed; paleae 4.5–6 mm long; ray florets 5–8, laminae 3–6 mm long; disc florets 8–25; cypselae pyriform to obovoid, 2.5–3.5 mm long, the peripheral weakly triquetrous, obscurely or not at all winged, the inner biconvex to weakly quadrate-flattened in cross section, obscurely, if at all, winged; rostra often geniculate, 0.1–0.3 mm high; pappi minutely erose to fimbriate cups 0.1–0.3 mm high; $2n = \text{ca. } 22$; flowering all year.

Usually in moist clearings in Montane Rain, Evergreen Seasonal, Pine-Oak-Liquidambar, and Pine-Oak forests and in Short-tree Savanna; rare to uncommon on Gulf Coastal Plain and in Northern Highlands, Eastern Highlands, Central Depression, and Sierra Madre; 250–1200 m. Southern Mex. (Chis.), Guat., Bel., Hond., Nic., C.R., Pan. CHIAPAS COLLECTIONS: *Ki-Joong Kim* 10048 (TEX); *RMK* 3108 (DS, MICH, TEX, UC, US); 3437 (DS, MICH, TEX, UC, US); *EM* 3757 (GH, MICH, MO, US); *S. Sundberg* 2372 (TEX); 27968; 37203; 38544; 40029; 46536; 46664; 46873; 46956; 52052; 52133; 55190; 57812.

Specimens from regions in which different varieties are sympatric are sometimes difficult to assign to one or another of the three closely allied and sometimes very similar varieties *parviceps*, *acapulcensis*, and *ramosissima*. Smaller leaves, shorter peduncles, smaller heads with fewer florets, and smaller cypselae with geniculate, virtually epappose, rostra usually suffice to distinguish var. *parviceps* from the other two.

1d. *Wedelia acapulcensis* Kunth var. *ramosissima* (Greenm.) Strother, Syst. Bot. Monogr. 33:55. 1991.

— *Zexmenia hispida ramosissima* Greenm. in Millsp. & Chase, Publ. Field Columbian Mus., Bot. Ser. 3:127. 1904. — *Zexmenia hispida* var. *ramosissima* (Greenm.) Greenm., Proc. Amer. Acad. Arts 41:165. 1905. — *Wedelia hispida* var. *ramosissima* (Greenm.) K. Becker, Phytologia 31:25. 1975. — TYPE: Mexico, Yucatán Peninsula, 1895, G. F. Gaumer 826 (GH!; isotypes: DS! GH! ILL! LL! MO! NY! UC! US!).

Wedelia adhaerens S. F. Blake, J. Wash. Acad. Sci. 22: 383. 1932. — TYPE: Guatemala, Petén, Dos Arroyos, 15 Mar 1931, H. H. Bartlett 12111 (US!; isotypes: GH! MICH!).

ILLUSTRATION: none found.

Erect to spreading, sometimes vinelike, basally woody, perennials (sometimes flowering first season) or shrubs, 3–25 dm high; leaves with obscurely to moderately winged petioles 2–5 (–15) mm long, blades ovate to lance-elliptic or lanceolate (rarely obscurely 3-lobed), 2–5 (–10) cm long, 7–20 (–50) mm wide, margins subentire to finely serrate or coarsely toothed, abaxial faces strigos-hispid with hairs to 1 mm long and with fine, erect, uncinat hairs 0.1–0.5 mm long, adaxial faces more scabrid, the hairs longer, coarser, fewer or none uncinat; peduncles mostly 5–40 (–115) mm long at anthesis; involucre 6–10 (–14) mm high; phyllaries 8–12, the outer often attenuate, somewhat spreading; paleae 5–8 mm long; ray florets 5 (–9), laminae 4–9 mm long; disc florets 15–25 (–40+); cypselae mostly pyriform to obovoid, 3–5 mm long, the peripheral triquetrous, (0)–2–3-winged, the inner biconvex or weakly quadrate in cross section, (0)–2-winged, rostra straight, erect, stout or slender, (0.2)–0.5–1.3 mm high; pappi to 0.5–1 mm long; flowering all year.

Usually in low, wet places in Evergreen Seasonal and Pine-Oak forests and in Short-tree Savanna; rare to uncommon on Gulf Coastal Plain and in Northern Highlands, Eastern Highlands, Central Depression, and SE Sierra Madre; 50–900 (–1500) m. Eastern and southern Mex. (Tam., S.L.P., Ver., Tab., Camp., Yuc., Q. Roo, Chis.), Guat. (Petén), Bel. CHIAPAS COLLECTIONS: *RMK* 2985 (DS, MICH, TEX, UC); *RMK* 3047 (DS, MICH, TEX, UC, US); *EM* 4428 (LL); *BV* 72-26 (DS); 13974; 26659; 37704; 46027; 46518; 46818; 47229; 52549; 54926; 56414.

1e. *Wedelia acapulcensis* Kunth var. *tehuantepecana* (B. L. Turner) Strother, Syst. Bot. Monogr. 33:60. 1991.

— *Wedelia tehuantepecana* B. L. Turner, Phytologia 65:355. 1988. — TYPE: Mexico, Oaxaca, 20 km NE of Juchitán, 100 m, 6 Nov 1970, A. Cronquist 10875 (TEX; isotypes: CAS! F! MICH! MO! NY, US!).

ILLUSTRATION: none found.

Erect, robust, basally woody, perennials or shrubs, to 2 m tall; leaves subsessile or with cuneate-winged petioles to 15 mm long, blades ovate or deltate to narrowly trullate, 4–8 (–15) cm long, 2–4 (–8) cm wide, margins sublacerate or coarsely toothed to finely serrate, abaxial faces scabrellous-hispid with hairs to ca. 1.5 mm long and with finer, erect hairs to ca. 0.5 mm long, none uncinat, sometimes minutely stipitate-glandular, adaxial faces with the hairs longer and coarser, none uncinat; peduncles mostly 2–5 (–12+) cm long; involucre 5–12 mm high; phyllaries 12–15 (–20); paleae (5)–6–9+ mm long; ray florets (5)–8–15, laminae 4–8 (–10+) mm long; disc florets 20–40 (–60+); cypselae obovate to cuneate in outline, 3.5–5 (–7) mm long, the peripheral triquetrous, (0)–2–3-winged, the inner biconvex in cross section, rostra straight, 0.5–1 mm high; pappi to 5 mm long; $2n = \text{ca. } 52$; flowering mostly Sep–Dec.

Mostly open or disturbed places in Evergreen Seasonal and Tropical Deciduous forests; uncommon in NW Central Depression and adjacent Sierra Madre; 500–900 m. Southern Mex. (Pue., Ver., Oax., Chis.), Guat., Nic., C.R. CHIAPAS COLLECTIONS: *Crq* 10454 (DS, GH, MICH, TEX); *M. Dillon* 697 (F); *Jks* 7123 (TEX); *EM* 4428 (F, MO); *SI* 2273 (TEX);

13372; 13530; 19820; 20103; 36729; 37376; 46493; 47928; 52717; 52772; 52849; 64905; 70897.

2. *Wedelia iners* (S. F. Blake) Strother, Syst. Bot. Monogr. 33:72. 1991.

— *Zexmenia iners* S. F. Blake, J. Wash. Acad. Sci. 13:145. 1923. — TYPE: El Salvador, Sonsonate, near Armenia, 18 Apr 1922, P. C. Standley 23498 (US!; isotype: NY!).

Wedelia keatingii D'Arcy, Phytologia 30:5. 1975. — TYPE: Panama, Coclé, N of El Valle de Antón, 700–800 m, 7 Feb 1947, Allen 4212 (MO!; isotype: MO!).

ILLUSTRATION: Ann. Missouri Bot. Gard. 62:1166. 1975, as *W. keatingii*.

Erect, annuals (sometimes persisting), 2–6+ dm high, stems usually maculate, proximal branches patent, then arcuate-ascending; petioles obscurely winged, 3–15(–45) mm long, leaf blades ovate-deltate to lanceolate, 2–6(–10) cm long, 1–2(–5) cm wide, bases cuneate, margins serrate, apices acuminate, abaxial faces sparsely scabrellous with hairs to 1+ mm long and pubescent with erect, uncinuate hairs ca. 0.1–0.3 mm long, sometimes minutely stipitate-glandular as well, adaxial faces more strongly scabrellous and with fewer uncinuate hairs; peduncles mostly 3–25 mm long at anthesis, to 50+ mm long in fruit; involucre cylindric-campanulate, 6–9 mm high, becoming larger and more hemispheric in fruit; phyllaries 8–13+, the outer oblong to linear, sparsely scabrellous and with fine, uncinuate hairs, cartilaginous at their bases, distally herbaceous, the inner shorter, broader, scarious, less hairy; paleae stramineous, often each with a darker nerve, scarious, 5–7 mm long, weakly carinate-alate, apically rounded; ray florets 5, pistillate, fertile, corollas white (at least adaxial faces) or pale yellow to orange, tubes 1.5–2 mm long, laminae oval to orbicular, 2–5 mm long; disc florets 8–20+; corollas pale yellow to orange, tubes 1–1.5 mm long, throats funnelform, 1–1.5 mm long, lobes deltate, 0.5–0.8 mm long; cypselae stramineous to gray or darker, often with dark spots or streaks, the peripheral narrowly cuneate, 3–4.5 mm long, triquetrous, (0–)2–3-winged, 1.5–4 mm wide, including wings (if any), glabrous or nearly so, the inner biconvex or somewhat quadrate, faces antrorsely puberulent with hairs 0.3–0.5 mm long, rostra ca. 0.5 mm high; pappi fimbriate crowns ca. 0.3–0.5 mm high plus 0–2(–3) unequal bristles to 1.5 mm long; $2n = 22$; flowering all year.

Usually along streams and in wet thickets, often ruderal, in Tropical Deciduous Forest; rare in Central Depression and on NW Pacific Coastal Plain; 250–900 m. Southern Mex. (Chis.), Guat., Hond., Salv., C.R., Nic., Pan.; Col. CHIAPAS COLLECTIONS: 26888; 46142; 51889; 70435.

3. *Wedelia purpurea* (Greenm.) B. L. Turner, Phytologia 65:354. 1988.

— *Aspilia purpurea* Greenm., Proc. Amer. Acad. Arts 40:39. 1904. — TYPE: Mexico, Chiapas, valley of Jiquipilas, 650–850 m, 16–18 Aug 1895, E. W. Nelson 2924 (GH!; isotypes: GH! US!).

ILLUSTRATION: none found.

Sprawling to erect, basally woody perennials or shrublets, stems mostly 20–40 cm long, from woody caudices; leaves subsessile or on obscurely, if at all, winged petioles 1–6 mm long, blades oblanceolate to lance-elliptic, 20–45 mm long, (5–)10–20 mm wide, bases cuneate, margins weakly revolute, distally serrate, apices acute, abaxial faces scabrous, the longer hairs 0.5–0.8 mm long, adaxial faces with fewer, coarser hairs; peduncles 3–6(–12) cm long; involucre campanulate, 8–12 mm high, becoming hemispheric in fruit; phyllaries 12–15, subequal, the outer linear-oblong to deltate-attenuate, strigos-hispid, proximally cartilaginous, distally herbaceous, acute, the inner broader, often shorter, more scarious, less hairy on surfaces, more ciliate; paleae stramineous or purplish, 5.5–7.5 mm long, weakly, if at all, carinate-alate proximal to the acute, sometimes erose, hispidulous tips; ray florets 5–8, neuter, corollas usually red, sometimes purple or coppery orange, tubes 3–4 mm long, laminae oblong-ovate, 10–18 mm long; disc florets 20–30(–50), corollas red, purplish, or coppery, tubes 1.5–2.5 mm long, throats funnelform, 3–3.5 mm long, lobes deltate, 0.9–1.4 mm long; cypselae blackish or slatey, sometimes mottled with purple, all obovate to cuneate in outline, 3.5–4 mm long, pyriform or plumply biconvex, little, if at all, winged, 1.5–2.5 mm wide, faces antrorsely puberulent or hispid with hairs 0.3–0.5 mm long, rostra stout, 0.1–0.3 mm long; pappi lacerate or erose cups, or saucers, 0.2–0.5 mm high plus 0–2 stout, unequal awns to 1+ mm long; $2n = \text{ca. } 24\text{--}28$; flowering mostly Aug–Oct.

Open places in Evergreen Seasonal and Pine-Oak forests; common in Sierra Madre and adjacent Central Depression, rare in Northern Highlands and on Central Plateau; 850–1700 m. Mexico (Gro., Oax., Chis.). CHIAPAS COLLECTIONS: E. P. Edwards 2 (MICH); RMK 3106 (DS, MICH, TEX, UC, US); RMK 3110 (TEX); L 1212 (DS); EM 4397 (LL); EM 5930 (LL); EWN 2924 (GH, US); P 9107 (UC); P 10207 (GH, POM, UC); Roe 853 (MICH); Urb 3340 (OBI, TEX); 25276; 27098; 27320; 38529; 40036; 45950; 46530; 46598; 48097; 51169; 52420; 60264.

79. XANTHIUM

Xanthium L., Sp. pl. 987. 1753. — LECTOTYPE: (J. P. Fourreau, Ann. Soc. Linn. Lyon ser. 2 17:110. 1869): *Xanthium strumarium* L.

Xanthium L. sect. *Acanthospermum* DC., Prodr. 5:523. 1836. — *Acanthoxanthium* (DC.) Fourr., Ann. Soc. Linn. Lyon ser. 2. 17:110. 1869. — TYPE: (fide ING): *Acanthoxanthium spinosum* (L.) Fourr. \equiv *Xanthium spinosum* L.

Coarse, erect annuals, to 15+ m high; one species with trifid spines at nodes; leaves mostly alternate, the proximal sometimes opposite, petiolate, blades roughly lanceolate to deltate, often somewhat lobed to divided, pinnately or palmately nerved, one or both faces dotted with resin globules and scabrellous or appressed-strigos-canescens, sometimes glabrate; capitulescences of axillary fascicles or racemiform to spiciform; heads unisexual, the pistillate mostly proximal to the staminate; pistillate heads 1–5

per axis or fascicle, subsessile, the involucre at anthesis ellipsoid to fusiform, the phyllaries early connate and forming spiny, bilocular perigynia or "burs" with one flower in each locule, the outermost 5–12+ phyllaries in 1–2 series, membrano-herbaceous, lance-ovate to lance-attenuate, variously hairy and dotted with resin globules, caducous, the inner 20–50+ phyllaries \pm connate at base, soon developing indurate, usually uncinat, spine-tips, obscurely in 5–12+ series, 1–2 innermost phyllaries often much stouter and forming straight, obliquely conical beaks, the perigynia usually hirsutulous to pilose, sometimes glabrate, sometimes stipitate-glandular, usually with sessile resin globules; pistillate florets without corollas, the style branches very slender, exerted from perigynia at bases of beaks; staminate heads 1–5+ per axis or fascicle, subsessile or pedunculate, the involucre hemispheric to saucer-shaped, the 5–8 membranous-herbaceous phyllaries in 1–2 series, free to base or nearly so, lance-ovate to lance-linear, similar to and intergrading with paleae, paleae scabrellous or pilosulous and dotted with resin globules, tubes essentially none, throats florets 20–60+ per head, corollas ochroleucous, sparsely pilosulous and dotted with resin globules; functionally staminate campanulate, lobes 5, deltate, filaments connate, anthers free, styles bifid or unbranched and capitate; "fruits" greenish to stramineous or brown, cartilaginous or hardened, globose to ellipsoid, spiny and beaked, bilocular perigynia ("burs") 8–35 mm long, the 20–50+ spines typically uncinat, the 1–2 beaks obliquely conical; cypselae proper blackish, elongate, somewhat flattened, often sinuate; pappi none; $x = 18$.

Some 85 or more "species" of *Xanthium* have been proposed; only two are generally recognized. Both are apparently native to subtropic and warm-temperate regions of the New World; they both range far beyond as nearly cosmopolitan weeds. One has been recorded from Chiapas.

REFERENCES: LÖVE, D. and P. DANSEREAU. 1959. Biosystematic studies of *Xanthium*: Taxonomic appraisal and ecological status. *Canad. J. Bot.* 37:173–208; MILLSPAUGH, C. F. and E. E. SHERFF. 1922. *Xanthium*. In N. L. Britton et al., *N. Amer. fl.* 33:37–44; WIDDER, F. J. 1923. Der Arten der Gattung *Xanthium*. *Repert Spec. Nov. Regni Veg. Beih.* 20:1–223.

1. *Xanthium strumarium* L., Sp. pl. 987. 1753.

— TYPE: Apparently number 1113.1 in LINN (photograph!).

Taxonomic synonymy for this taxon runs to perhaps 100+ basionyms and combinations at specific and infraspecific ranks — see references listed.

ILLUSTRATION: D. S. Correll and Helen B. Correll. 1975. Aquatic and wetland plants of southwestern United States, 1647.

Coarse annuals 8(–10+) dm high; stems often mottled or streaked with purple, scabrellous to hirsute; petioles 4–15 cm long, leaf blades deltate to pentagonal, palmately nerved, sometimes obscurely 3–5(–7)-lobed, mostly 6–15 cm long and wide, bases broadly cuneate to somewhat cordate, margins subentire to coarsely and remotely callous-toothed, apices obtuse to acute, both faces scabrellous and dotted with resin globules; capitules-

cence axes often zig-zag, overall 3–6(–12) cm long, the 1–5+ pistillate heads crowded proximal to the 1–10 staminate; pistillate heads subsessile, the outer 5–12+ phyllaries 5–10 mm long, the inner 20–50+ connate, becoming indurate and, usually, uncinat; staminate heads subsessile or on peduncles to 6+ mm long, the 5–8+ phyllaries 2–5+ mm long, variously scabrellous to hirtellous and with stipitate-glandular hairs and sessile resin globules; receptacles flattened to (reputedly) cylindric; paleae similar to phyllaries, mostly 2–4 mm long; staminate florets 30–60+ per head, corollas 1.5–3 mm long; mature perigynia or burs greenish to brown, globose to ellipsoid, 10–35 mm long, dotted with resin globules and variously hairy, sometimes glabrate; $2n = 36$.

Ruderal in disturbed, seasonally damp, open places in Tropical Deciduous and Evergreen Seasonal forests; sporadic in Central Depression; 500–850 m. Cosmopolitan weed of subtropics, extending well into temperate regions of the globe. CHIAPAS COLLECTIONS: *Pa* 1737 (CAS); 20020; 37968; 70361; 70581.

80. ZEXMENIA

Zexmenia La Llave in P. La Llave and J. M. Lexarza, *Nov. veg. descr.* 1:10. 1824. — TYPE: *Zexmenia serrata* La Llave.

Herbs or shrubs, scandent or clambering to erect, stems 1–5 m long; leaves opposite, petioles narrowly, if at all, margined, not manifestly winged, blades ovate-elliptic to lanceolate, pinnately nerved or obscurely triplinerved from near or well above their bases, margins serrate or denticulate, faces scabrous-hispid to pilose-hispid or villous; heads usually 3–6 together in umbelliform or corymbiform clusters at ends of primary and secondary branches, held within to well beyond the foliage; peduncles mostly ebracteate; involucre broadly campanulate to hemispheric, mostly 4–7 mm high, excluding the longer, outermost phyllaries, usually impressed at their bases; phyllaries 15–30 in 2–3+ series, the outer sometimes longer, cartilaginous at bases with erect or spreading, herbaceous tips, the inner ovate to lanceolate, more chartaceous to scarious or membranous; receptacles flat to slightly convex; paleae tardily shed, chartaceous to scarious, conduplicate, navicular, carinate-alate, lance-linear to lance-ovate in outline, shorter than the disc florets at anthesis, distally hispidulous, obtuse to acute, often dilated and recurved at tips; ray florets 8–16, pistillate, fertile, corollas yellow to orange, laminae narrowly ovate to elliptic with 2–3 teeth; disc florets 20–100, bisexual, fertile, corollas yellow to orange, tubes narrowly cylindric, ca. half as long as the funnelliform throats, lobes 5, deltate, abaxially hispidulous, minutely papillate on adaxial margins; anther appendages stramineous, broadly to narrowly deltate, erect; style branches slender, hispidulous, shortly attenuate beyond the 2 stigmatic lines; cypselae stramineous to dark

brown or blackish, often marked with rufous or purplish dots or streaks, oblanceolate to broadly or narrowly cuneate in outline, the peripheral triquetrous, the others flattened to weakly biconvex, all attenuate to small bases, patently inserted on receptacles, carpodia small, bifaceted, the cypselae bodies distally sparsely strigoso-hispid, wings thin and membranous or thick and corky, usually extending onto the rostrum, ciliolate; pappi ultimately borne on distinct rostra and not directly on the bodies of the cypselae, of 2–3, hispidulous, subequal to unequal awns plus 4–10, much shorter, often connate, setae forming narrow, erose to lacerate cups.

Two species; both grow in southern Mexico and Central America. The two species of *Zexmenia* are very similar to each other and might well be treated as varieties of a single species. Among genera of Ecliptinae, *Zexmenia* is near *Oyedaea* and certain species of *Otopappus* and *Wedelia* (Villaseñor and Strother 1989).

REFERENCES: VILLASEÑOR, J. L. and J. L. STROTHER. 1989. *Tuxtla*, a new genus for *Zexmenia pittieri* (Compositae: Heliantheae). Syst. Bot. 14:529–540; STROTHER, J. L. 1991. Taxonomy of *Complaya*, *Elaphandra*, *logeton*, *Jefea*, *Wamalchitamia*, *Wedelia*, *Zexmenia*, and *Zyzyxia* (Compositae – Heliantheae – Ecliptinae). Syst. Bot. Monogr. 33:1–111.

- a. Outermost phyllaries longer than the inner; laminae of ray corollas 3–6(–9) mm long; hairs on margins of cypselae 0.3–0.8 mm long 2. *Z. virgulta*
 aa. Outermost phyllaries usually shorter than the inner; laminae of ray corollas mostly 5–11 mm long; hairs on margins of cypselae 0.1–0.4 mm long 1. *Z. serrata*

1. *Zexmenia serrata* La Llave in P. La Llave and J. M. Lexarza, Nov. veg. descr. 1:13. 1824.

— *Lipochaeta?* *serrata* (La Llave) DC., Prodr. 5:611. 1836. — TYPE: Mexico, Veracruz, San José del Corral, *P. La Llave* s.n. (holotype: unknown?; isotype?: G-Herb. Delessert *fide* Blake 1930; photograph ex G-Herb. Lambert in MICH!).

Zexmenia scandens Hemsl. in F. Godman and O. Salvin, Biol. cent.-amer., Bot. 2:174. 1881. — TYPE: Mexico, Veracruz, “Valley of Cordova” (protologue), 17 Feb 1866, *E. Bourgeau* 1930 (K!; isotypes: GH! MICH! NY! US!).

Zexmenia trachylepis Hemsl. in F. Godman and O. Salvin, Biol. cent.-amer., Bot. 2:175. 1881. — TYPE: Mexico. “Yucatán and Tabasco” (protologue), *E. K. Johnson* 24 (K!; drawing and fragments: GH!; isotype: NY!; photograph and fragments ex K in US!).

Zexmenia dulcis J. M. Coult., Bot. Gaz. 16:99. 1891. — TYPE: Guatemala, Livingston, Río Dulce, Mar 1889, *J. Donnell Smith* 1607 (F!; isotype: GH!; US!).

Verbesina sylvicola Brandegee, Univ. Calif. Publ. Bot. 10:419. 1924. — TYPE: Mexico, Veracruz, Santa Lucrecia, Apr 1923, *C. A. Purpus* 8997 (UC!).

ILLUSTRATION: none found.

Stems 1–3(–5) m long; petioles 6–20 mm long; leaf blades ovate to lance-elliptic or lanceolate, 5–15 cm long, 2–6 cm wide, bases rounded to broadly cuneate, margins serrate to denticulate, apices acute to acuminate, abaxial faces scabrous-hispid to piloso-hispidulous or villous with erect or antrorse, straight, arched, or curled hairs 0.1–1 mm long, adaxial faces more scabrous-hispid with coarser hairs; heads mostly 3–6+ together; peduncles 1–3 cm long; involucre campanulate to hemispheric, 4–8(–10) mm high; phyllaries 24–30, subequal (with the outer lance-linear to lanceolate) or graduate (with the outer shorter, more ovate), in either form: the outer cartilaginous at bases and with herbaceous, erect to spreading tips, the inner more lanceolate and chartaceous to scarious, ciliolate; paleae 5.5–7 mm long, obtuse to acute, often dilated, membranous, and

recurved at tips; ray florets 8–13, corollas yellow to yellow-orange, tubes 1.3–2 mm long, laminae narrowly elliptic, 5–11 mm long; disc florets 20–100, corollas yellow, tubes 1.5–2.2 mm long, throats funnelliform, 2.5–3.5 mm long, lobes deltate, 0.6–1 mm long; cypselae 3–5(–6.5) mm long, 2–3.5 mm wide, including wings, the wings usually becoming thick, corky, ciliolate with hairs 0.1–0.4 mm long, rostra 0.3–0.6 mm high; pappi of 2–3 subequal awns 2–5 mm long plus 4–10 setae forming narrow, erose to lacerate cups 0.3–1 mm high; flowering mostly Jan–May.

Usually disturbed places such as along streams or roads or bordering agricultural clearings in Tropical Rain, Lower Montane Rain, Montane Rain, Evergreen Seasonal, Pine-Oak-Liquidambar, and Pine-Oak forests; common in Eastern Highlands, rare on Gulf Coastal Plain, in Northern Highlands, and on Central Plateau; 180–2000 m. Southern Mex. (Ver. Oax., Tab., Chis.), Guat., Bel., Hond. CHIAPAS COLLECTIONS: *And* 5523 (CAS, MICH); *R. Burnham* 018 (MO); *Cro* 46609 (MO); *Cro* 64986 (CAS, UC); *Cro* 65093 (UC); *Gar* 585 (CAS); *MS* 10748 (TEX); *MS* 11010 (TEX, UC); *MS* 11290 (ARIZ); *Pa* 1841 (CAS); *PM* 172 (CAS); *S&S* 1897 (MO); *So* 1603 (DS, MICH, UC); *T* 3657 (DS, MICH); *T* 5433 (UC); *T* 5464 (UC); *T* 9596 (CAS); 8797; 9125; 16179; 23857; 33721; 33778; 34089; 49389; 49406; 49955; 50440; 57151; 57341; 58005; 58391.

2. *Zexmenia virgulta* Klatt, Bull. Soc. Bot. Belgique 31:203. 1892.

— LECTOTYPE: (Strother 1991:89): Costa Rica, “Suru-bres près San Mateo” (protologue), 10 Jan 1892, *H. Pittier* 7027 (GH!).

Zexmenia leucactis S. F. Blake, J. Bot. 53:307. 1915 [2 Oct].

— TYPE: Guatemala, Retalhuleu, Retalhuleu, May 1877, *K. G. Bernoulli and Cario* 1396 (K!; fragments ex K in GH!).

Zexmenia chiapensis Brandegee, Univ. Calif. Publ. Bot. 6:197. 1915 [30 Oct]. — TYPE: Mexico, Chiapas, Finca Irlanda, Jun 1914, *C. A. Purpus* 7192 (UC!; isotypes: F! NY! US!).

ILLUSTRATION: none found.

Stems 1–3 (–5) m long; petioles 12–25 mm long; leaf blades lanceolate, 7–18 cm long, 2–6 cm wide, bases rounded to broadly cuneate, margins serrate, apices long-attenuate, abaxial faces piloso-hispidulous with erect or antrorse, straight, arched, or curled hairs 0.1–1 mm long, adaxial faces more strigillose with coarser hairs; heads mostly 3–6+ together; peduncles 2–5 cm long; involucre hemispheric, 4–6 mm high, excluding longer, outermost, virgulate phyllaries, spreading in fruit; phyllaries 22–26, the outer 2–6 usually 7–15+ mm long with ovate, cartilaginous bases and linear to spatulate, herbaceous, erect to spreading tips, the inner shorter, progressively more ovate to lanceolate and chartaceous, ciliolate; paleae 5–7 mm long, obtuse to acute; ray florets 8–16, corollas yellow, often drying paler, tubes 1–2 mm long, laminae narrowly elliptic, 3–6(–9)

mm long; disc florets 40–100, corollas yellow, tubes 1.5–2 mm long, throats funnelform, 2.5–3.5 mm long, lobes deltate, 0.6–1 mm long; cypselae 3.5–5 mm long 1.5–3 mm wide, including wings, the wings usually thin, membranous, ciliolate with hairs 0.3–0.8 mm long, rostra 0.2–0.5 mm high; pappi of 2–3 subequal to unequal awns 3–5 mm long plus 6–10 setae forming narrow, erose to lacerate cups 0.5–1 mm high; flowering mostly Jan–Mar.

Usually in disturbed sites, such as along streams or roads or bordering agricultural clearings in wet tropical forests; rare in E Sierra Madre and on adjacent Pacific Coastal Plain; 30–800+ m. Southern Mex. (Chis.), Guat., C.R., Pan. CHIAPAS COLLECTIONS: *Cro* 32754 (MO); *Cro* 47494 (MO); *P* 7192 (MO, UC).

81. ZINNIA

Zinnia L., Syst. nat., ed. 10. 1221, 1377. 1759, nom. conserv. — TYPE: *Zinnia peruviana* (L.) L. \equiv *Chrysogonum peruvianum* L.

For synonymy, see Torres (1963).

Annuals or perennial herbs or suffrutescent, mostly less than 1 m high; leaves all or mostly opposite, rarely alternate distally, sessile or petiolate, blades mostly narrowly deltate, sometimes elliptic, filiform, or aciculate, margins entire, faces usually glandular-punctate, often scabrellous, rarely woolly; heads mostly borne singly, scattered; peduncles sometimes distally dilated and fistulose; involucre narrowly cylindric to hemispheric, mostly 4–15 mm high; phyllaries 12–30+ in 3–5+ series, strongly imbricate, orbicular to obovate; receptacles broadly to narrowly conical; paleae chartaceous to scarious, often pigmented distally, navicular; ray florets mostly 5–21 (to 100+ in some “double” cultivars), ordinarily pistillate, fertile, corollas variously colored (yellow, orange, red, purple, white), tubes usually wanting or very short, laminae orbicular or oblong to spatulate, marcescent; disc florets 20–150+, bisexual, fertile, corollas variously colored, narrowly cylindric, tubes very short, throats sometimes dilated near their bases, lobes 5, deltate to lance-linear, commonly unequal, abaxially glabrous or shaggy-hirsute, adaxially often papillate to villous; style branches slender to rather stout, bearing short, deltoid to conic appendages; cypselae ob-compressed or -flattened to weakly triquetrous (ray) or laterally flattened (disc), orbicular to narrowly elliptic or cuneate in outline, glabrous or pubescent, often callous-margined and/or ciliate, faces sometimes tuberculate; pappi none or of 1(–2) awns or aristate scales projecting from shoulder(s) of cypselae; $x = 12$ (11, 10).

About 15 (senso stricto) to 20 (including *Tragoceros* Kunth, q.v.) species, all American, centered in Mexico, ranging principally from southeastern Great Plains (Kans., Okl.) and southern Rockies (Colo., Ariz., N.M.) to south-central Mexico (Mich., Pueb.), less common through southern Mex. (Oax., Chis), Central America, Antilles, and South America.

REFERENCE: TORRES, A. S. 1963. Taxonomy of *Zinnia*. Brittonia 15: 1–25.

- a. Involucre 4–8 mm high; ray florets 5–10, corollas pale yellow to whitish, laminae 3–8 mm long; cypselae ovate-elliptic to suborbicular, 2.4–3.8 mm long 2. *Z. purpusii*
- aa. Involucre 9–23 mm high; ray florets mostly 8–21+, corollas usually brightly colored, laminae 8–35 mm long; cypselae obovate to cuneate or linear-elliptic, 7–10 mm long.
 - b. Involucre mostly cylindric or campanulate, 9–15 mm high; paleae apically obtuse, minutely erose; ray corolla laminae 8–25 mm long; pappi (disc only) of single, stout awns 1. *Z. peruviana*
 - bb. Involucre hemispheric, 11–23 mm high; paleae apically fimbriate-fringed; ray corolla laminae mostly 20–35 mm long; pappi none 3. *Z. violacea*

1. *Zinnia peruviana* (L.) L., Syst. nat., ed. 10. 2121. 1759.

— *Chrysogonum peruvianum* L., Sp. pl. 920. 1753. — TYPE: Peru [Torres (1963) indicated type as: “de Jussieu, photograph 94161, P-JU”].

For additional synonymy, see Torres (1963).

ILLUSTRATION: Fig. 60.

Annuals, 3–5(–10) dm high; leaves sessile or nearly so, blades narrowly deltate to lanceolate, mostly 25–35 mm long, 8–18 mm wide, faces scabrellous; heads scattered; peduncles slender or somewhat thickened, 1–3(–5) cm long; involucre mostly cylindric or campanulate, 9–15 mm high; phyllaries

oblong to obovate or spatulate, yellowish green and chartaceous proximally, greenish or purple-banded and scarious distally; receptacles conical; paleae proximally stramineous, chartaceous, distally purplish scarious, apices obtuse, minutely erose; ray florets mostly 8–15+, corollas scarlet or yellow to yellow-green, paler abaxially, laminae mostly spatulate, 8–20(–25) mm long; disc florets 10–80, corollas yellow to translucent proximally, purplish distally, very slender, 5–7 mm long, tubes very short, throats little to much dilated near their bases, lobes lance-linear, ca. 1 mm long, yellow-villous adaxially; style branches short, scarcely appendaged; cypselae blackish with buff margins, flattened, linear to narrowly elliptic in outline, 7–10 mm long, subsericeous (ray) or glabrous but for ciliolate margins; “pappi” (disc only) solitary, stout, subulate extensions of the inner shoulders of the cypselae, 4–6 mm long; $2n = 24$.

Disturbed places in Tropical Deciduous and Pine-Oak forests and in Thorn Woodland; common on Central Plateau and in Central Depression; 600–2200 m. Southeastern Ariz.; Mex. (Son., Chih., Tam., Dgo., Zac., S.L.P., Jal., Aguasc., Gto., Qro., Hgo., Mich., Méx., D.F., Mlos., Pue., Ver., Gro., Oax., Chis.), Guat., Hond., Nic.; Antill.; S.A. (Col., Ven., Ecu., Peru, Bol., Arg.). CHIAPAS COLLECTIONS: *C 143* (DS); *Crq 9677* (TEX); *Da 29948* (UC); *Gli CH-35* (CAS, TEX); *L 1439* (DS); *L 1764* (DS); *L 2437* (DS); *Pa 901* (CAS); *12076*; *12159*; *13058*; *13213*; *13404*; *13501*; *20155*; *23394*; *27658*; *46010*; *46066*; *46426*; *52361*; *53677*; *69998*.

2. *Zinnia purpusii* Brandege, Univ. Calif. Publ. Bot. 10:420. 1924.

— TYPE: Mexico, Chiapas, Hacienda Monserrate, Sep 1923, *C. A. Purpus 9108* (UC!).

ILLUSTRATION: none found.

Annuals, to 3 dm high; leaves sessile or nearly so, blades lance-linear to lance-triangular, 3–7 times as long as wide, 2–5 cm long, (3–)4–7 mm wide, bases truncate to cordate-clasping, faces sparsely scabrellous, especially on veins and margins; heads scattered; peduncles mostly 1–3 cm long in fruit; involucre hemispheric, 4–8 mm high; phyllaries green or, usually, suffused with purple, orbicular to ovate or obovate, distally scarious-margined; receptacles sharply conical; paleae longer than disc florets, distally purplish and acute or attenuate; ray florets 5–10, corollas pale yellow to whitish, laminae orbicular to ovate, 2–8 mm long; disc florets 40–80, corollas proximally yellowish, distally purple, very slender, ca. 2.5 mm long, tubes very short, throats laterally flattened and somewhat dilated near their bases, lobes lance-linear, ca. 0.5 mm long; style branches apically dilated, subtruncate; ray cypselae blackish, obcompressed to triquetrous, ovate-elliptic to suborbicular in outline, 2.4–3.8 mm long, pectinate-winged, disc cypselae laterally flattened, elliptic to obovate in outline, 2.4–3.8 mm long, margins

callous, pectinate, ciliate, faces smooth or tuberculate; pappi none, shoulders of disc cypselae sometimes cornute; $2n = 24$.

Rare in Evergreen Seasonal and Pine-Oak forests; uncommon in W Sierra Madre; 870–1000 m. Southern Mex. (Jal., Cma., Gro., Chis.). CHIAPAS COLLECTIONS: *P 9108* (UC); *28481*; *44354*; *52708*.

3. *Zinnia violacea* Cav., Icon. 1:57, t. 81. 1791.

— TYPE: “Habitat in Mexico. Vidi floridam in Regio horto Matritensi mense Iulio.” No specimen located; use of this name here is based on the illustration.

Zinnia elegans Jacq., Icon. pl. rar. 3:15, t. 589. 1793 [1792]; Coll. Bot. 5:152. 1796 [1797]. — TYPE: “Patria mihi ignota est”; no specimen seen; use of this name here is based on the illustration.

Zinnia australis F. M. Bailey, Bot. Bull. Dept. Agric. 3:14. 1891. — TYPE: Australia, Queensland, “Walsh River,” *Barclay-Miller s.n.* (BRI).

ILLUSTRATION: see synonymy.

Annuals, coarse, often to 1 m high; leaves ± sessile, blades lance-deltate, mostly 4–10(–15) cm long, 2–3(–7) cm wide, bases truncate to subcordate, ± clasping, faces scabrellous; heads scattered, peduncles often fistulose, mostly 8–20 mm long; involucre mostly hemispheric, 11–23 mm high; phyllaries orbicular to obovate, glabrous or nearly so, stramineous and chartaceous proximally, green to purplish and herbaceous to scarious distally; receptacles conical, to 2.3 mm high; paleae longer than cypselae, proximally stramineous, distally purple, scarious, fimbriate-fringed; ray florets mostly 8–21 (to ca. 100+ in cultivars), corollas yellow to orange, or red to purple, or white, sometimes variegated, laminae spatulate, mostly 20–35 mm long; disc florets 100–150+, corollas usually yellowish proximally and within, purplish distally, very slender, 7–8 mm long, tubes ca. 1.5 mm long, dilated at their bases, lobes ca. 2.5 mm long, densely villous adaxially; style branches with minute deltoid-penicillate appendages; cypselae grayish black, often with paler, stramineous splotches, flattened, obovate to cuneate in outline, 7–10 mm long, glabrous or appressed-puberulent, ciliolate; pappi none; $2n = 24$.

Roadsides and other disturbed places, especially near habitations, in Tropical Deciduous and Pine-Oak forests; rare in Eastern Highlands, uncommon on Central Plateau and in Central Depression; (120–)760–1770 m. Mex. (Sin., Dgo., Cma., Mich., Méx., Mlos., Gro.); much cultivated and perhaps adventive in Chis. and C.A. (Guat., Bel., Hond., Salv., Pan.); surely adventive in Fla., S.A., and the Old World. CHIAPAS COLLECTIONS: *L 1646* (DS); *L 2663* (DS); *L 2664* (DS); *Mz 9659* (TEX); *Mz 9663* (TEX); *T 3130* (DS, LL); *11233*; *46457*; *69961*.

82. ZYZYXIA

Zyzyxia Strother, Syst. Bot. Monogr. 33:91. 1991. — TYPE: *Oyedaea lundellii* H. Rob. = *Zyzyxia lundellii* (H. Rob.) Strother

Shrubs or trees, to 3+ m tall; leaves opposite, petiolate, blades lance-elliptic to lanceolate, coriaceous, mostly pinnately nerved, sometimes some obscurely triplinerved, veins prominent abaxially, prominent adaxially, faces hirtellous to scabridulous, the abaxial with glandular hairs as well; heads borne singly or in open or crowded, subumbelliform associations of 3–8+;

peduncles mostly ebracteate; involucre campanulate to hemispheric, 6–12 mm diam.; phyllaries 15–20+, 2–3-seriate, unequal; receptacles flat to convex; paleae shorter than or equalling disc florets, chartaceous to scarious, proximally conduplicate, carinate, distally flatter and usually dilated into a flaglike tip; ray florets 12–16, neutral, corollas yellow, tubes funnelform, laminae linear-oblong to elliptic; disc florets 35–50+, bisexual, fertile, corollas yellow, tubes narrowly cylindric, shorter than or equalling the narrowly campanulate to cylindric-funnelform throats, lobes 5, deltate, hispidulous distally on abaxial faces; style branches slender, attenuate and hispidulous beyond the 2 stigmatic lines; cypselae brownish, rounded-cuneate to oblong in outline, the peripheral (at least the sterile ovaries of the rays) obscurely triquetrous, the inner compressed, biconvex or obscurely quadrate, not winged (or obscurely and very narrowly winged), all sparsely hispidulous distally and on the angles; pappi of 2(–3) stout, persistent awns 1/3–2/3 as long as the cypselae plus 6–10+ free or variously connate, much shorter bristles or scales.

Monotypic.

1. *Zyzyxia lundellii* (H. Rob.) Strother, Syst. Bot. Monogr. 33:93. 1991.

— *Oyedaea lundellii* H. Rob., Wrightia 6:45. 1979. — TYPE: Guatemala, Petén, La Cumbre, ca. 3 km E of Cerro la Cueva, in *zapotal*, 22 Mar 1977, C. L. Lundell 20642 (US!; isotypes: LL! US! UTD).

ILLUSTRATION: Syst. Bot. Monogr. 33:94. 1991.

Shrubs or trees to 3+ m high; petioles 5–20 mm long, little, if at all, winged distally; leaf blades 5–8(–14) cm long, 18–25(–45) mm wide, bases cuneate to rounded, margins minutely revolute, entire or denticulate, apices obtuse to acute; peduncles 5–20 mm long; outer phyllaries greenish, ovate, oblanceolate, or pandurate, proximally cartilaginous, distally

herbaceous, scabridulous, the middle phyllaries stramineous to greenish, pandurate to oblanceolate, less hairy, the inner phyllaries more stramineous, oblong to subrotund, scarious to membranous, nearly glabrous but for ciliolate margins; paleae mostly stramineous, sometimes distally purplish, 7–9 mm long; ray corolla tubes ca. 2 mm long, laminae 10–15 mm long; disc corolla tubes 2–3 mm long, throats 2.5–3.5 mm long, lobes 0.8–1 mm long; cypselae 3–4 mm long; awns of pappi 1–3 mm long, bristles 0.3–1 mm long; flowering Jan–Mar.

Zyzyxia lundellii was listed for the Lacandon region of eastern Chiapas (as *Oyedaea lundellii*) by Martinez et al. (1994). The taxon is otherwise known from pine and pine-oak forests in Belize and adjacent Guatemala.



FIGURE 1. *Acemella radicans* (Jacq.) R. K. Jansen. A, habit, $\times 1/2$; B, disc florets with palea, $\times 10$; C, ray floret, $\times 10$; D, opened disc floret, $\times 25$; E, anther and style, greatly enlarged; F, cypsela, $\times 15$; G, capitula, $\times 3$. From: Fieldiana, Bot. 24(XII):558. 1976; as *Splanthes ocymifolia*.

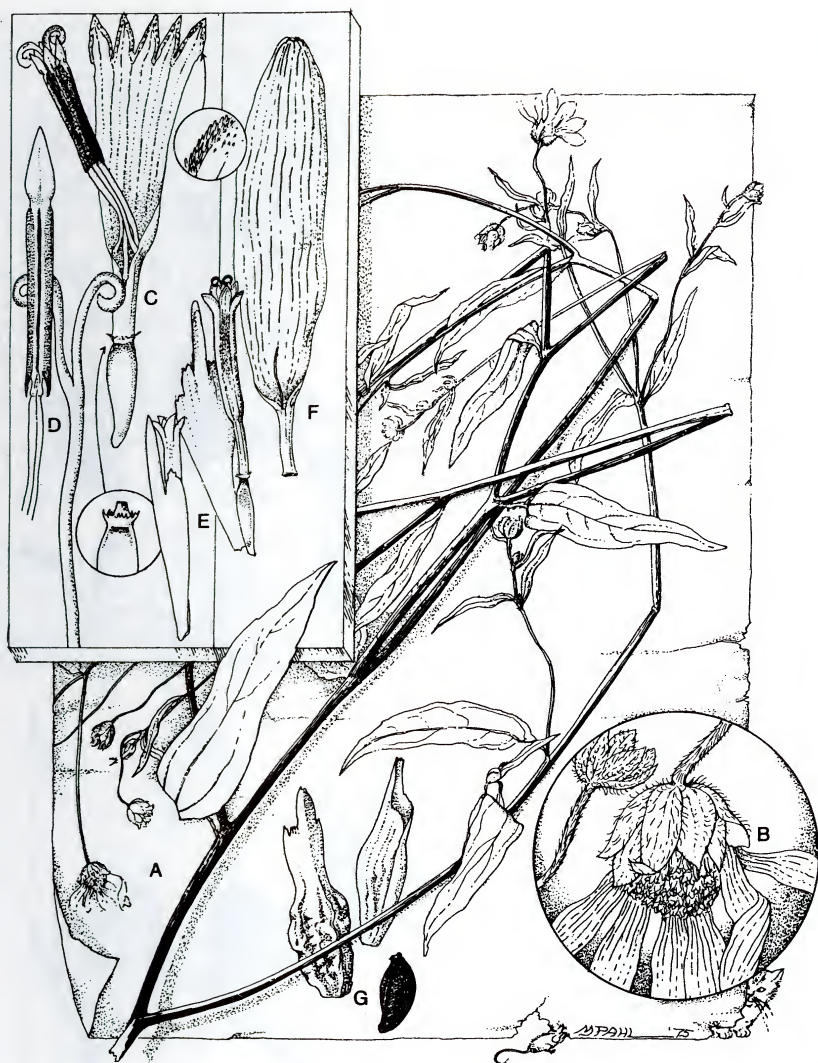


FIGURE 2. *Aldama dentata* La Llave & Lex. A, flowering shoot, $\times 1/2$; B, head, $\times 2$; C, opened disc floret, $\times 10$; D, stamen and style, $\times 20$; E, two disc florets, one with embracing palea, one with opened palea, $\times 7$; F, ray corolla, $\times 7$; G, cypsel and two paleae, $\times 5$. From: Fieldiana, Bot. 24(XII):504. 1976.

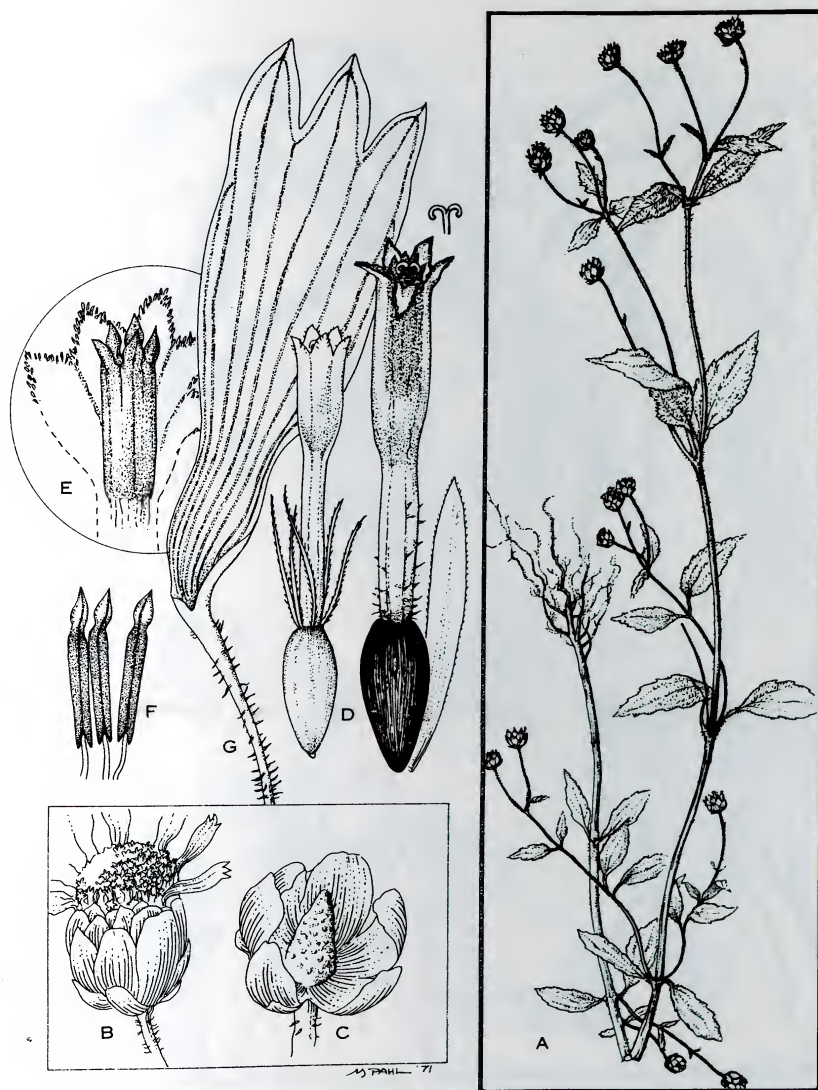


FIGURE 3. *Alepidocline annua* S. F. Blake. A, habit, $\times 1/2$; B, head, $\times 4$; C, phyllaries and receptacle, $\times 4$; D, disc florets, $\times 19$; E, opened disc floret, $\times 27$; F, three anthers, $\times 27$; G, ray corolla, $\times 19$. From: Fieldiana, Bot. 24(XII):505. 1976.



FIGURE 4. *Ambrosia cumanensis* Kunth. A, flowering shoot, $\times 1/2$; B, three bracts and one "fruit," $\times 10$; C, two immature "fruits," $\times 10$; D, anther, $\times 16$; E, opened staminate floret, $\times 15$; F, style tip, staminate floret, greatly enlarged; G, staminate floret, $\times 15$; H, two staminate heads, $\times 6$. From: Fieldiana, Bot. 24(XII):506. 1976.

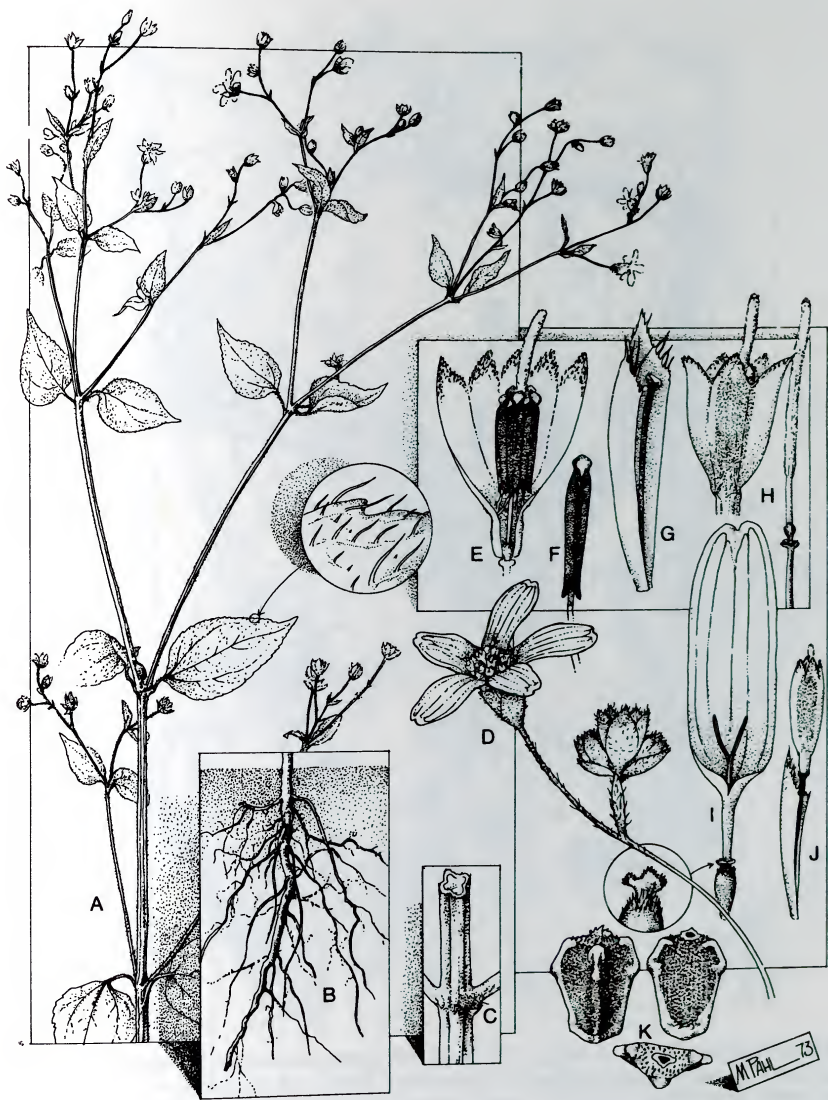


FIGURE 5. *Baltimora recta* L. A, flowering shoot, $\times 1/2$; B, roots, $\times 1/2$; C, stem detail, natural size; D, two heads, $\times 2$; E, opened disc floret, $\times 9$; F, anther, $\times 13$; G, palea with sterile disc ovary, $\times 9$; H, details of disc florets, $\times 9$; I, ray floret, $\times 6$; J, disc floret with palea, $\times 6$; K, three cypselae, $\times 5$. From: Fieldiana, Bot. 24(XII):508. 1976.



FIGURE 6. *Bidens squarrosa* Kunth. A, habit, $\times 1/2$; B, capitulescence, natural size; C, cypsel, $\times 5$; D, palea, ray floret, and disc floret, $\times 6$; E, stamen, greatly enlarged; F, opened disc floret, $\times 12$; G, style branches, greatly enlarged. From: Fieldiana, Bot. 24(XII):509. 1976.

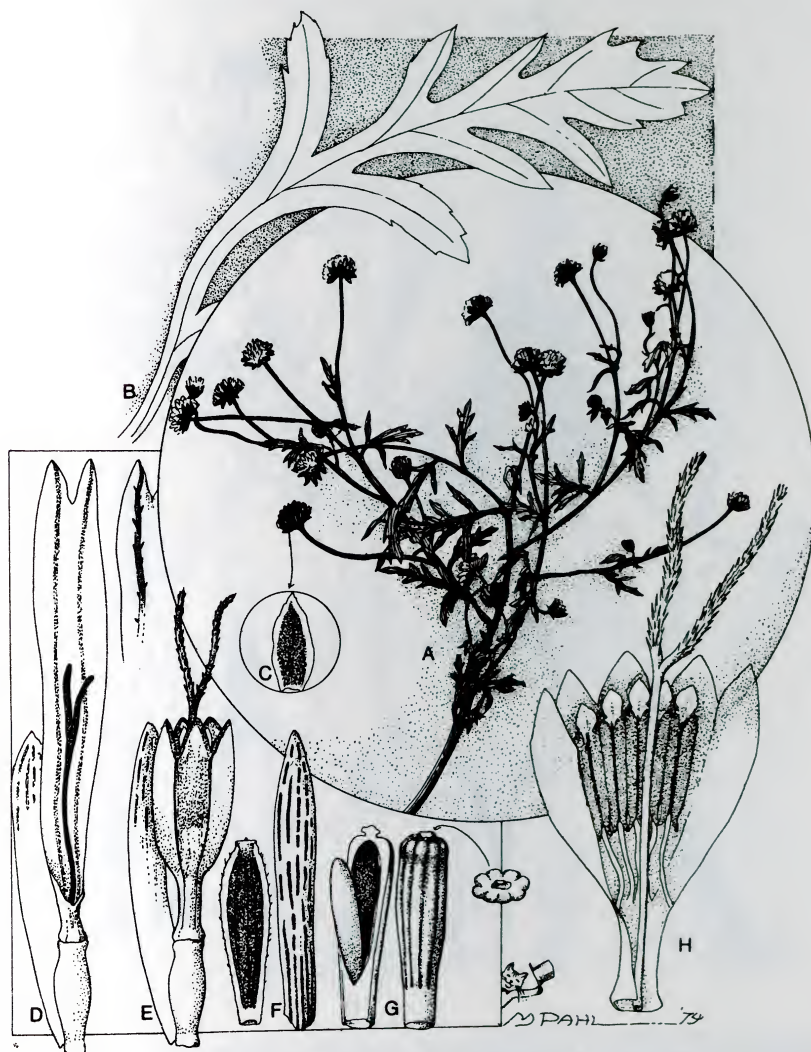


FIGURE 7. *Chrysanthellum americanum* (L.) Vatke. A, flowering shoot, $\times 1/2$; B, a proximal leaf, $\times 5$; C, phyllary, much enlarged; D, ray floret with inner phyllary, $\times 18$; E, disc floret with palea, $\times 18$; F, cypsel and palea, $\times 7\ 1/2$; G, cypselae, $\times 7\ 1/2$; H, opened disc floret, $\times 34$. From: Fieldiana, Bot. 24(XII):513. 1976.



FIGURE 8. *Clibadium surinamense* L. A, flowering shoot, $\times 1/2$; B, part of capitulescence, $\times 2$; C, opened head, $\times 5$; D, corolla and style from pistillate floret, $\times 10$; E, pistillate floret, $\times 10$; F, functionally staminate floret, $\times 10$; G, opened functionally staminate floret, $\times 10$; H, stamen, scale unknown. From: Fieldiana, Bot. 24(XII):514. 1976; as *Clibadium arboreum*.



FIGURE 9. *Comaclinium montanum* (Benth.) Strother. A, flowering shoot, $\times 1/2$; B, disc floret and ray floret, $\times 4\ 1/2$; C, corollas of disc florets, $\times 6\ 1/2$; D, stamen, much enlarged. From: Fieldiana, Bot. 24(XII):572. 1976; as *Dyssodia montana*.



FIGURE 10. *Coreopsis mutica* DC. var. *microcephala* D. J. Crawford. A, flowering shoot, $\times 1/2$; B, head, natural size; C, style, $\times 13$; D, opened disc floret, $\times 13$; E, ray floret, $\times 5$; F, two cypselae, $\times 3$; G, disc floret with palea, $\times 5$. From: Fieldiana, Bot. 24(XII):515. 1976.



FIGURE 11. *Cosmos caudatus* Kunth. A, part of a leaf, $\times 1/2$; B, fruiting heads, $\times 1/2$; C, two cypselae, $\times 3\ 1/2$; D, style branches, greatly enlarged; E, opened disc floret, $\times 8$; F, anther, greatly enlarged; G, disc floret, $\times 4\ 1/2$; H, ray corolla, $\times 4\ 1/2$; I, palea, $\times 4\ 1/2$. From: Fieldiana, Bot. 24(XII):516. 1976.

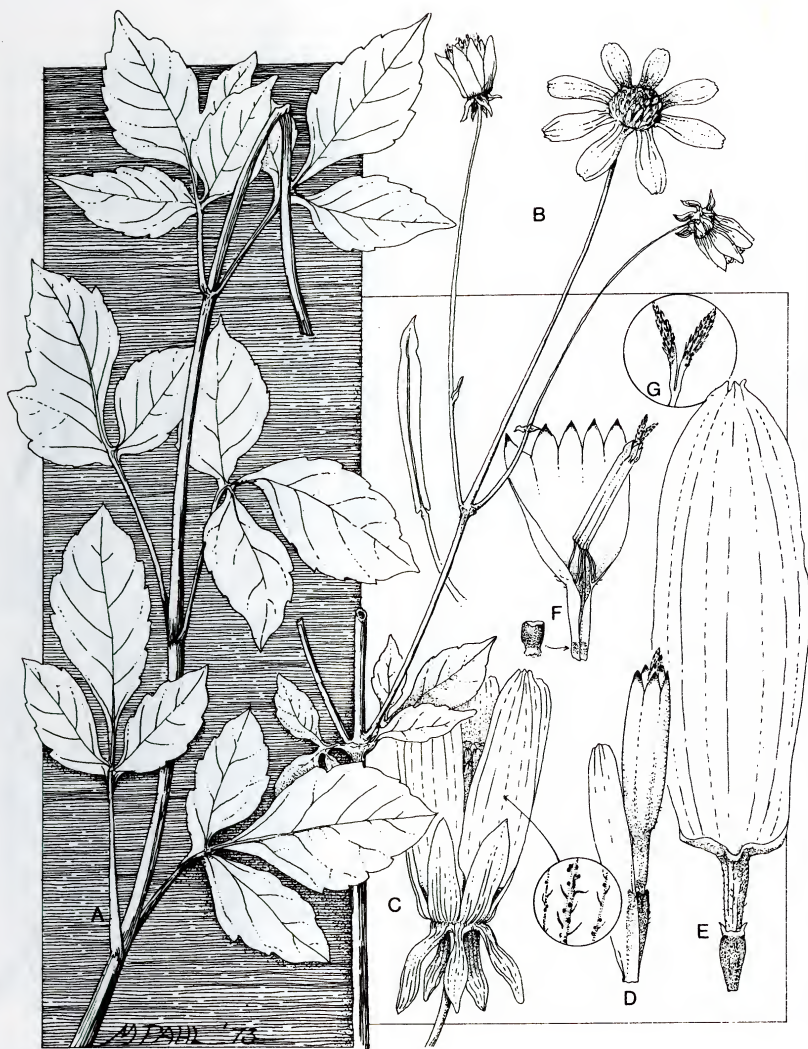


FIGURE 12. *Dahlia coccinea* Cav. A, part of a shoot, $\times 1/2$; B, flowering shoot, $\times 1/2$; C, head, $\times 1\ 1/2$; D, disc floret with palea, $\times 4$; E, ray floret, $\times 4$; F, opened disc floret, scale unknown; G, style branches, $\times 5$. From: Fieldiana, Bot. 24(XII):518. 1976.



FIGURE 13. *Delilia biflora* (L.) Kuntze. A, habit, $\times 1/2$; B, cluster of heads, $\times 2$; C, two heads and two cypselae, $\times 3\ 1/2$; D, opened head, $\times 9$; E, opened disc floret, $\times 20$; F, disc floret, $\times 15$; G, pistillate floret, $\times 15$; H, stamen, $\times 30$. From: Fieldiana, Bot. 24(XII):519. 1976; as *Delileia berterii*.



FIGURE 14. *Eclipta prostrata* (L.) L. A, flowering shoots, $\times 1/2$; B, heads, $\times 2$; C, disc floret, $\times 20$; D, ray floret, $\times 20$; E, two cypselae, $\times 17$; F, opened disc floret, $\times 30$; G, stamen and style, greatly enlarged. From: Fieldiana, Bot. 24(XII):521. 1976; as *Eclipta alba*.



FIGURE 15. *Espejoa mexicana* DC. A, habit, $\times 1/2$; B, head, $\times 2 1/2$; C, floret with immature ovary, $\times 5$; D, corolla, $\times 6$; E, opened floret with stamen and style, $\times 10$. From: Fieldiana, Bot. 24(XII):573. 1976.

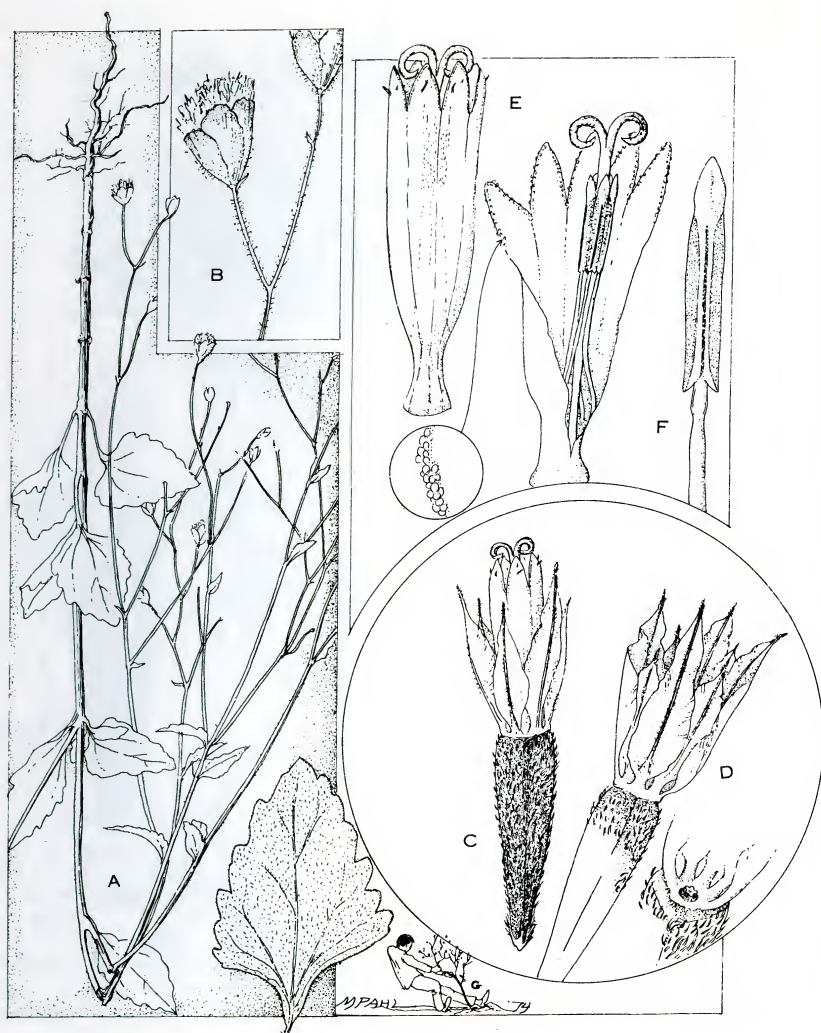


FIGURE 16. *Florestina latifolia* (DC.) Rydb. A, habit, $\times 1/2$; B, head, $\times 1\ 1/2$; C, floret, $\times 5$; D, pappus, $\times 10$; E, floret without ovary, ditto opened, $\times 10$; F, stamen, $\times 22$. From: Fieldiana, Bot. 24(XII):574. 1976.

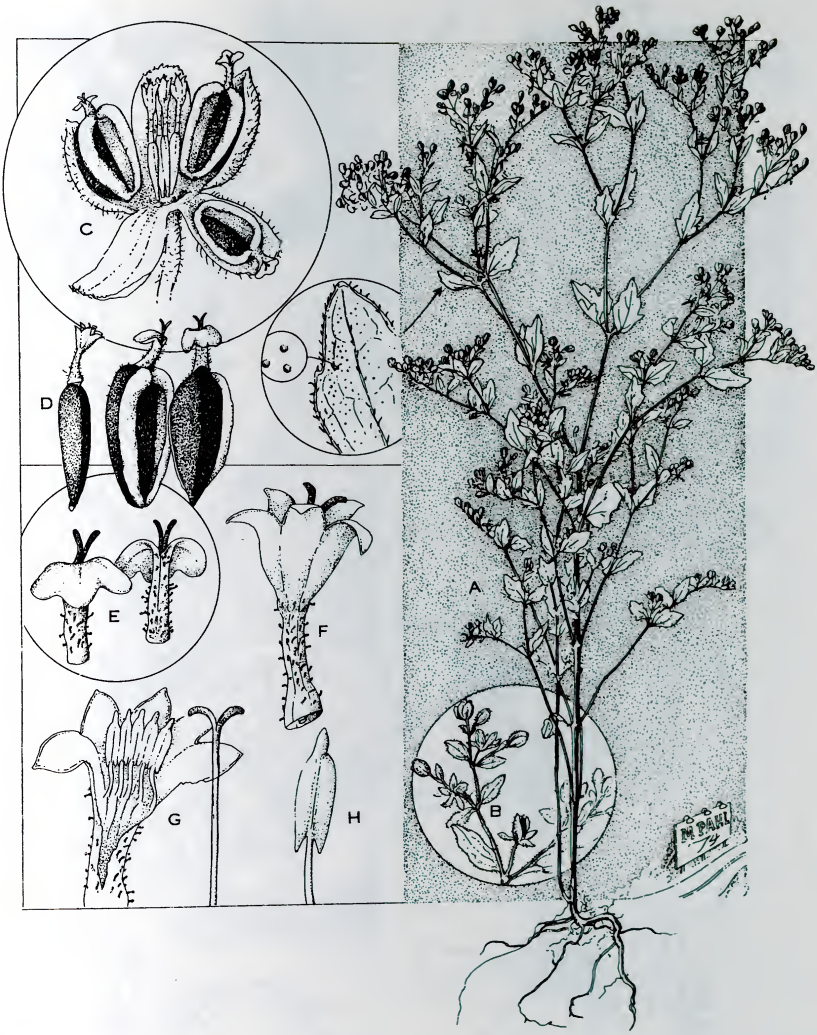


FIGURE 17. *Galeana pratensis* (Kunth) Rydb. A, habit, $\times 1/2$; B, heads, $\times 1$; C, opened head, $\times 7$; D, florets with young fruits, $\times 10$; E, ray florets without ovaries, $\times 20$; F, disc floret without ovary, $\times 25$; G, opened disc floret with style, $\times 25$; H, anther, enlarged. From: Fieldiana, Bot. 24(XII):575. 1976.



FIGURE 18. *Galinsoga quadriradiata* Ruiz & Pav. A, habit, $\times 1/2$; B, opened disc floret, $\times 18$; C, head, $\times 2 1/2$; D, palea, $\times 13$; E, ray floret, $\times 13$; F, disc floret, $\times 13$; G, cypselae, $\times 13$. From: Fieldiana, Bot. 24(XII):523. 1976; as *Galinsoga urticaefolia*.

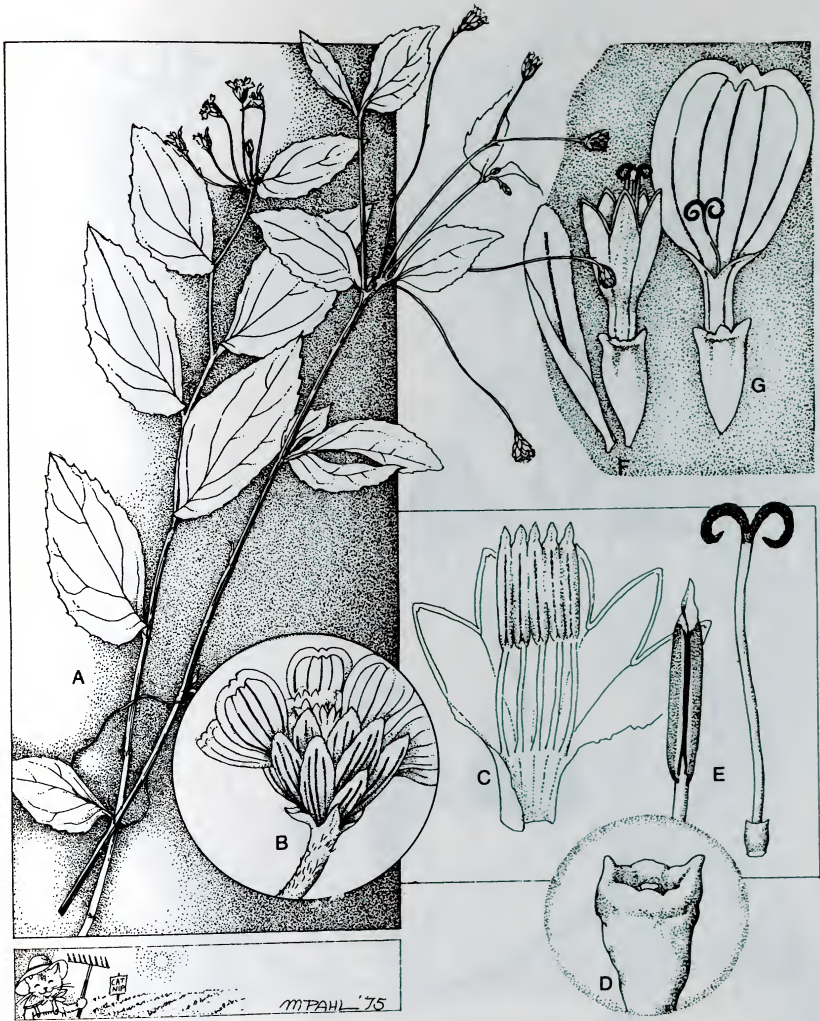


FIGURE 19. *Goldmanella sarmentosa* (Greenm.) Greenm. A, flowering shoots, $\times 1/2$; B, head, $\times 3$; C, opened disc floret, $\times 13\ 1/2$; D, cypselum, $\times 10$; E, anther and style, greatly enlarged; F, disc floret with palea, $\times 7$; G, ray floret, $\times 7$. From: Fieldiana, Bot. 24(XII):525. 1976.

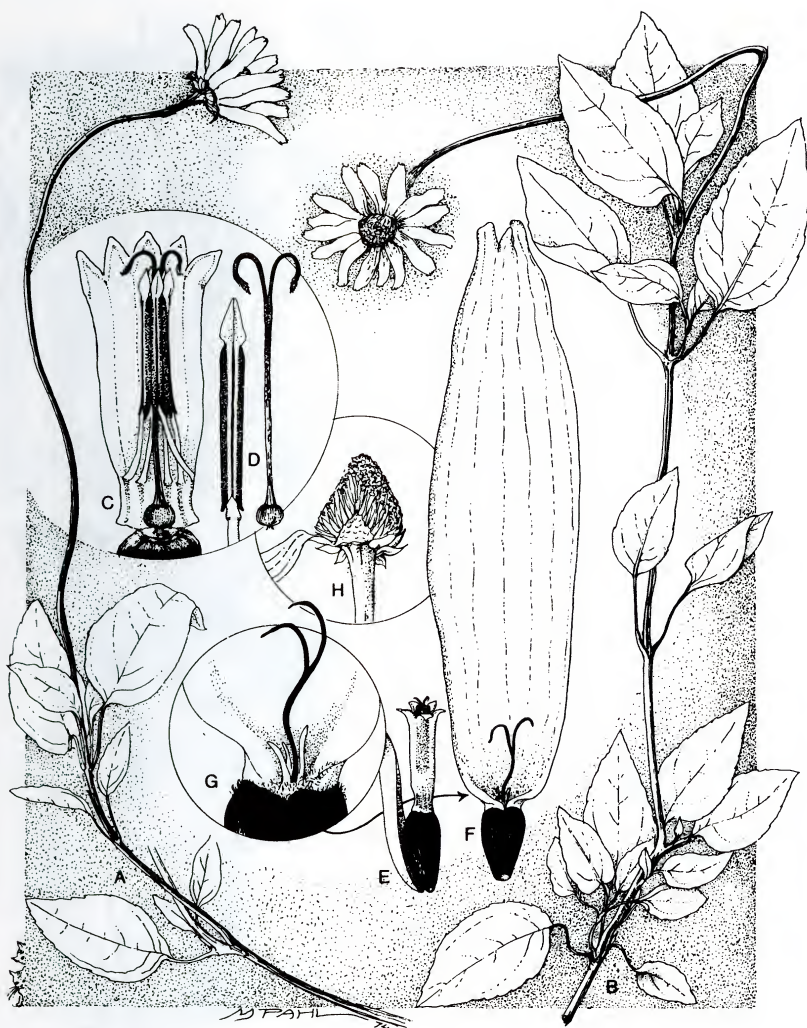


FIGURE 20. *Heliopsis oppositifolia* (Lam.) S. Diaz. A, B, flowering shoots, $\times 1/2$; C, opened disc floret, $\times 9$; D, anther and style, $\times 11$; E, disc floret with palea, $\times 4$; F, ray floret, $\times 4$; G, detail of ray floret, $\times 7\ 1/2$; H, detail of head, $\times 3/4$. From: Fieldiana, Bot. 24(XII):526. 1976; as *Heliopsis buphthalmoides*.

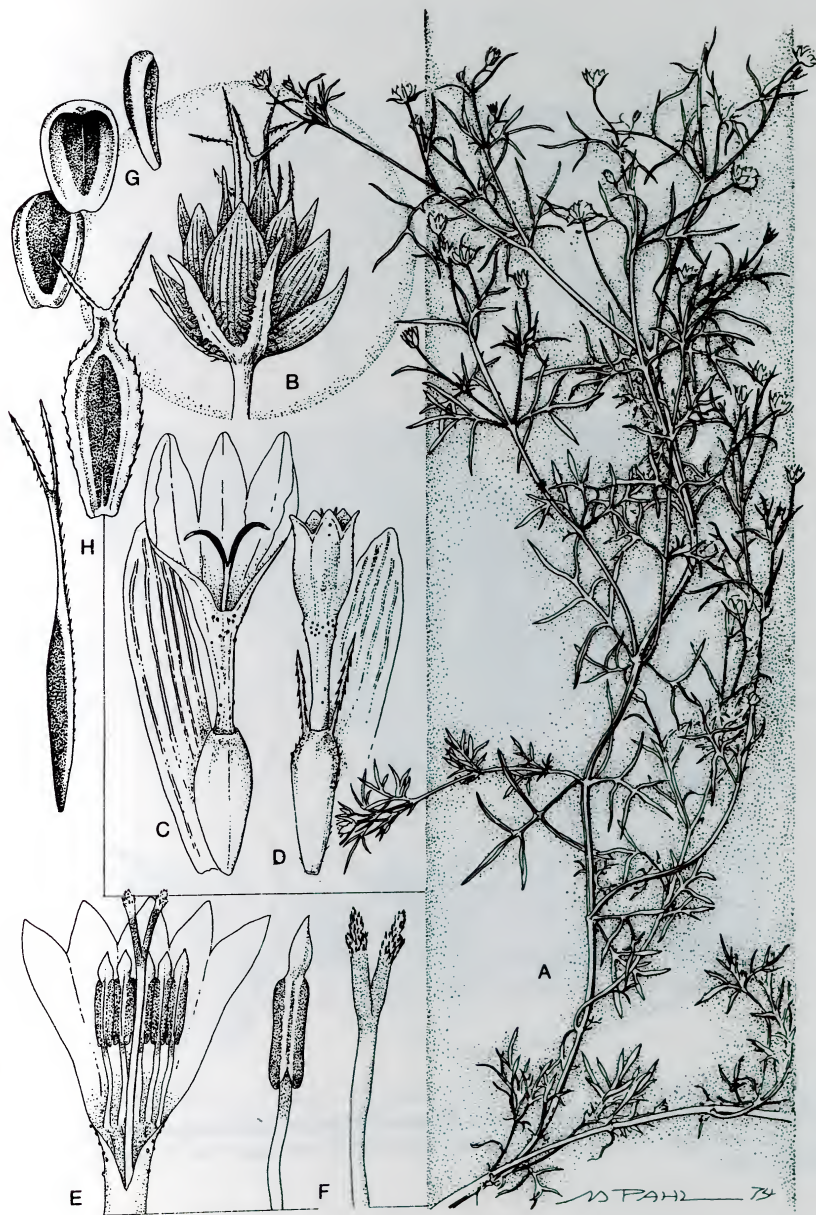


FIGURE 21. *Heterosperma pinnatum* Cav. A, habit, $\times 1/2$; B, head in fruit, $\times 4$; C, ray floret with palea, $\times 12\ 1/2$; D, disc floret with palea, $\times 12\ 1/2$; E, opened disc floret, $\times 25$; F, stamen and style, greatly enlarged; G, ray cypselae, $\times 5$; H, disc cypselae, $\times 5$. From: Fieldiana, Bot. 24(XII):527. 1976.

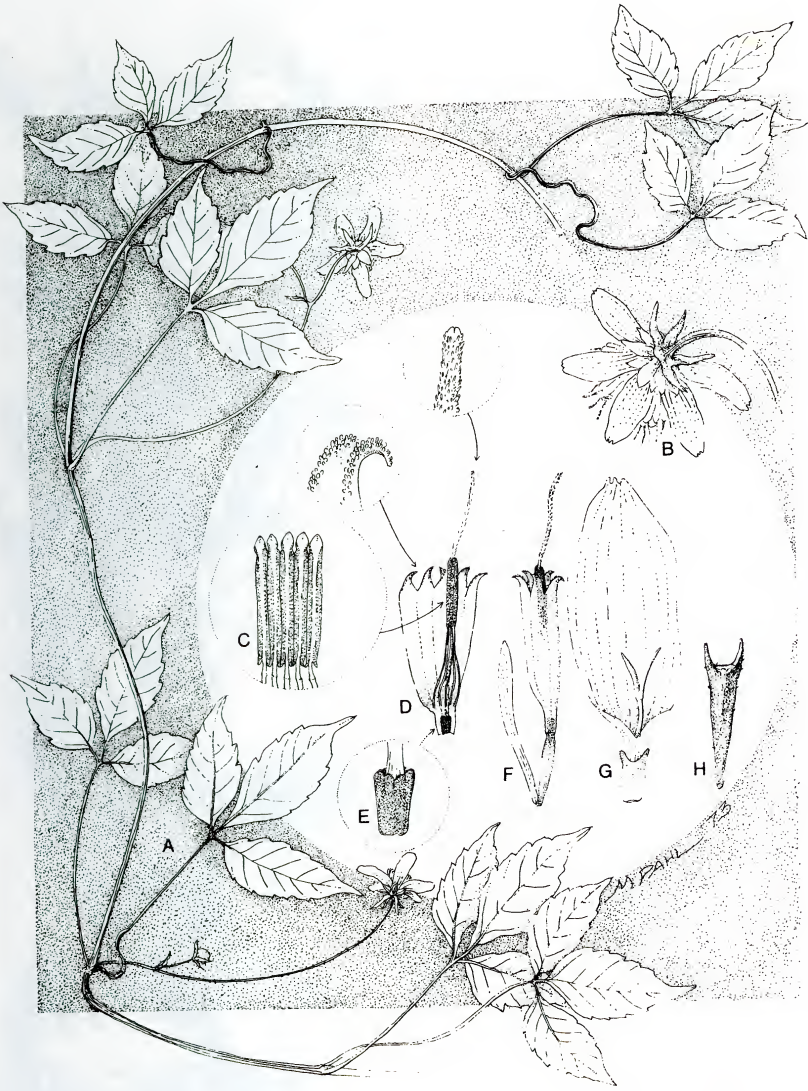


FIGURE 22. *Hidalgoa ternata* La Llave & Lex. A, flowering shoot, $\times 1/2$; B, head, $\times 1\ 1/4$; C, stamens, $\times 10$; D, opened disc floret, $\times 4$; E, style base, $\times 10$; F, disc floret with palea, $\times 4$; G, ray floret, $\times 4$; H, cypsel, $\times 7\ 1/2$. From: Fieldiana, Bot. 24(XII):528. 1976.

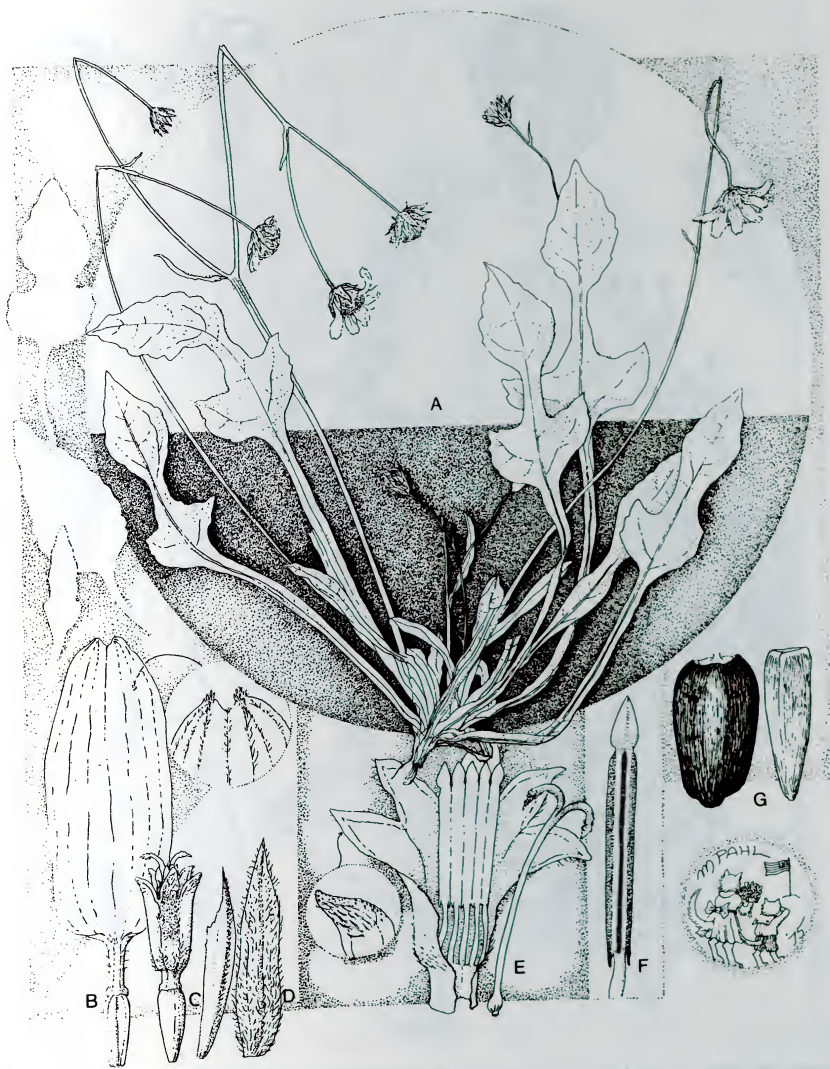


FIGURE 23. *Iostephane trilobata* Hemsl. A, habit, $\times 1/2$; B, ray floret, $\times 4\ 1/2$; C, disc floret with palea, $\times 4\ 1/2$; D, phyllary, $\times 4\ 1/2$; E, opened disc floret, $\times 8$; F, stamen, greatly enlarged; G, cypselae, $\times 6$. From: Fieldiana, Bot. 24(XII):530. 1976.

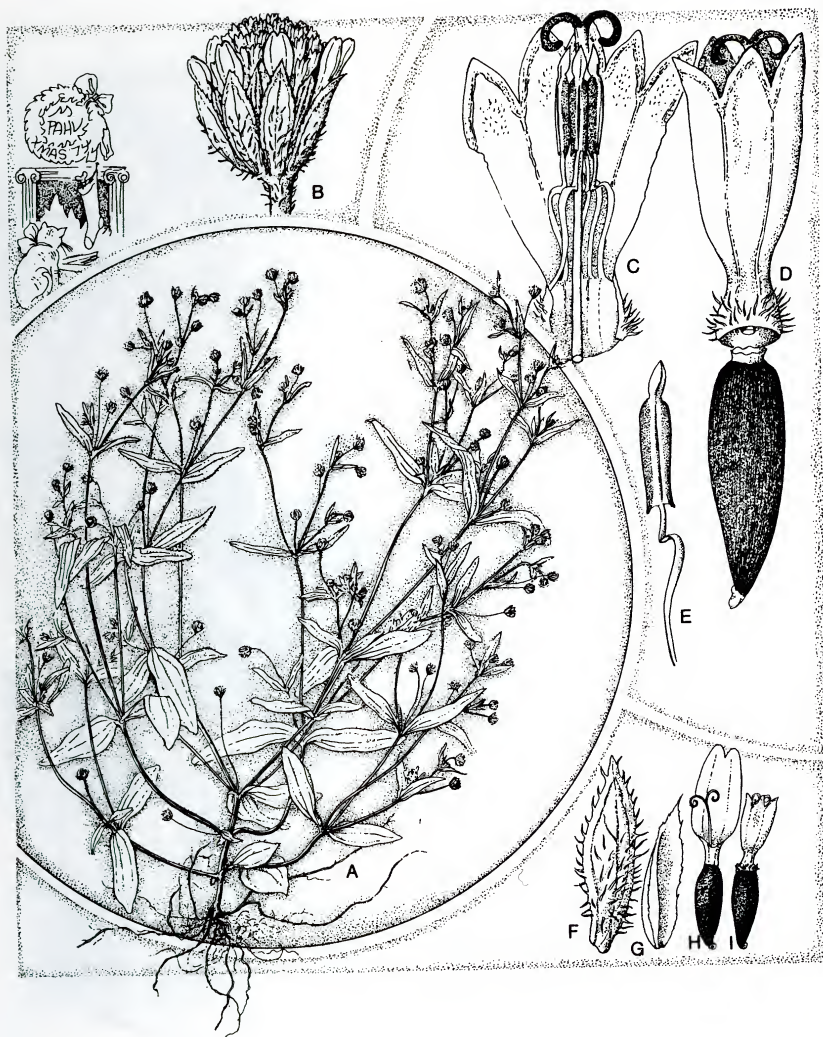


FIGURE 24. *Jaegeria hirta* (Lag.) Less. A, habit, $\times 1/2$; B, head, $\times 9$; C, opened disc floret, $\times 27$; D, older disc floret with young fruit, $\times 27$; E, stamen, greatly enlarged; F, phyllary, $\times 15$; G, palea, $\times 15$; H, ray floret, $\times 15$; I, disc floret, $\times 15$. From: Fieldiana, Bot. 24(XII):531. 1976.



FIGURE 25. *Jaegeria standleyi* (Steyerm.) B. L. Turner. A, habit, $\times 1/2$; B, base of plant, $\times 1\ 1/2$; C, plant viewed from above, $\times 2\ 1/2$; D, involucre, $\times 6$; E, opened disc floret, $\times 20$; F, stamen, greatly enlarged; G, disc floret, ray floret, and palea, $\times 12$; H, cypsel, $\times 17$; I, style branches, greatly enlarged. From Fieldiana, Bot. 24(XII):507; as *Aphanactis standleyi*.



FIGURE 26. *Lagascea helianthifolia* Kunth var. *helianthifolia*. A, flowering shoot, $\times 1/2$; B, stamen, greatly enlarged; C, single involucre and floret, $\times 3 1/2$; D, opened floret, $\times 3 1/2$; E, floret in bud, $\times 4$; F, detail of involucre and fruit, $\times 5$. From: Fieldiana, Bot. 24(XII):532. 1976.

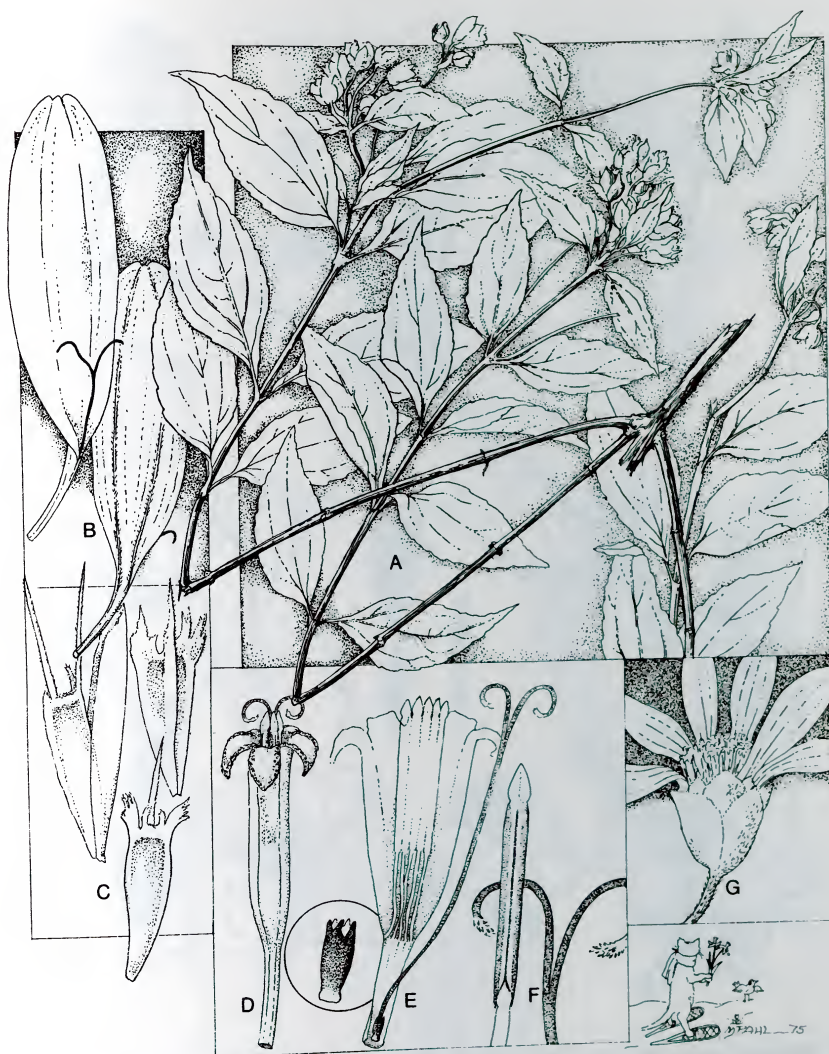


FIGURE 27. *Lasianthaea fruticosa* (L.) K. M. Becker var. *fruticosa*. A, flowering shoot, $\times 1/2$; B, ray corollas, $\times 4$; C, cypselae, $\times 6$; D, disc floret without ovary, $\times 5\ 1/2$; E, opened disc floret, $\times 5\ 1/2$; F, stamen and style, greatly enlarged; G, head, $\times 2$. From: Fieldiana, Bot. 24(XII):533. 1976.

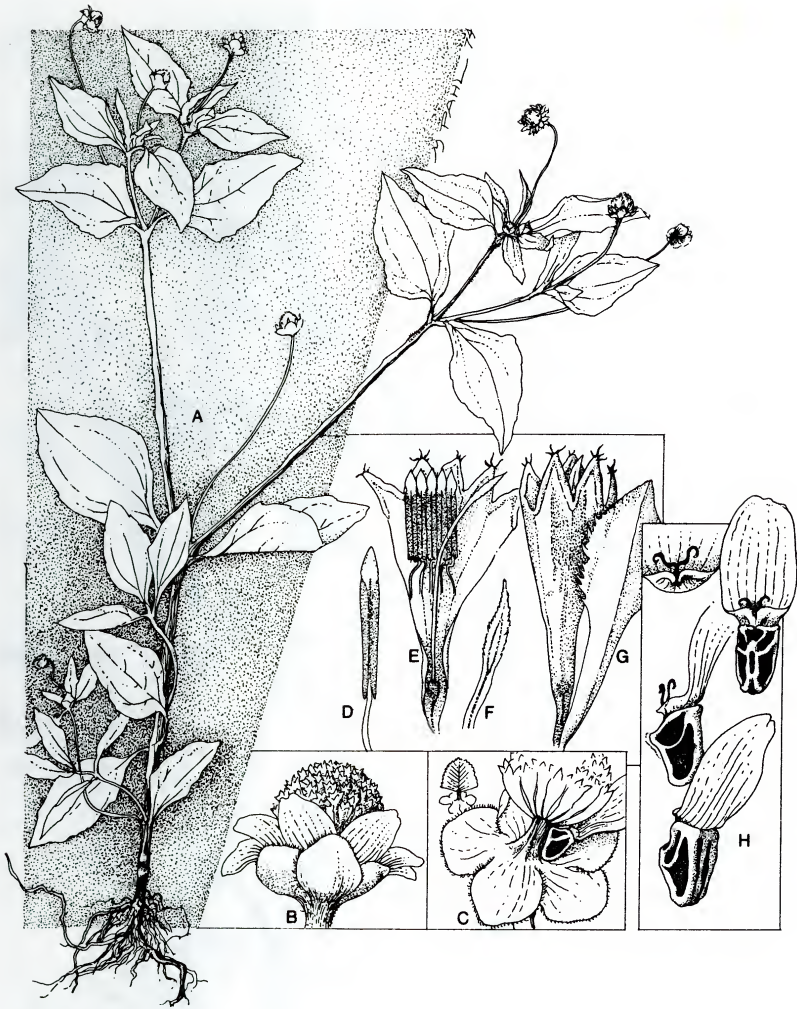


FIGURE 28. *Melampodium divaricatum* (Rich.) DC. A, habit, $\times 1/2$; B, head, $\times 2 1/2$; C, details of heads, $\times 2 1/2$; D, stamen, greatly enlarged; E, opened disc floret, $\times 10$; F, style branch, greatly enlarged; G, disc floret with palea, $\times 10$; H, ray florets and fruits, $\times 4 1/2$. From: Fieldiana, Bot. 24(XII):534. 1976.



FIGURE 29. *Melanthera nivea* (L.) Small. A, flowering shoot, $\times 1/2$; B, proximal or mid-stem leaf, $\times 1/2$; C, heads, $\times 3$; D, opened disc floret, $\times 15$; E, floret and palea, $\times 15$; F, cypselae, $\times 15$. From: Fieldiana, Bot. 24(XII):535. 1976.

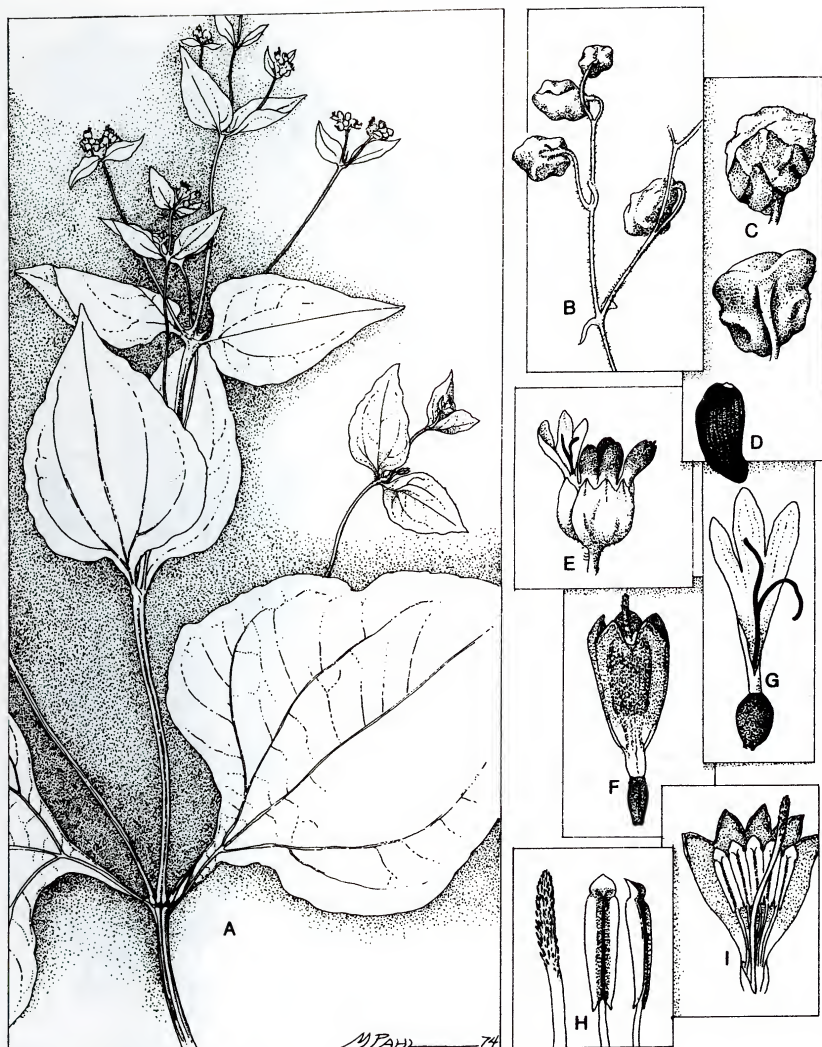


FIGURE 30. *Milleria quinqueflora* L. A, flowering shoot, $\times 1/2$; B, C, "fruits," $\times 1\ 1/2$; D, cypsela, $\times 2\ 1/2$; E, head, $\times 4$; F, disc floret, $\times 10$; G, ray floret, $\times 8$; H, style and anthers, greatly enlarged; I, opened disc floret, $\times 10$. From: Fieldiana, Bot. 24(XII):536. 1976.



FIGURE 31. *Neurolaena macrophylla* Greenm. A, flowering shoot, $\times 1/2$; B, part of capitulescence, $\times 2$; C, head, $\times 3$; D, opened head, $\times 1\ 1/2$; E, floret with palea, $\times 6\ 1/2$; F, opened floret with style, $\times 6\ 1/2$; G, stamen, $\times 20$. From: Fieldiana, Bot. 24(XII):538. 1976.

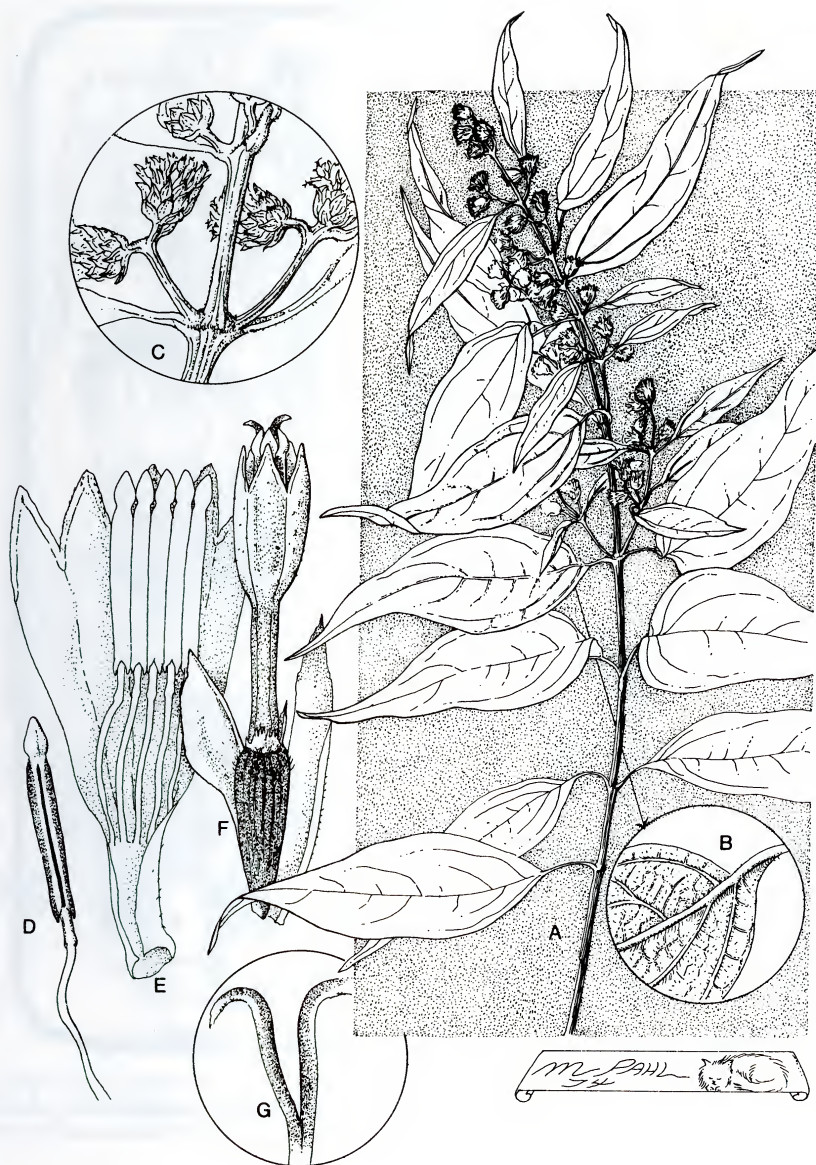


FIGURE 32. *Otopappus brevipes* B. L. Rob. A, flowering shoot, $\times 1/2$; B, leaf base, scale unknown; C, heads, $\times 2$; D, stamen, $\times 13$; E, opened floret, $\times 12\ 1/2$; F, floret with palea, $\times 8$; G, style branches, $\times 13$. From: Fieldiana, Bot. 24(XII):541. 1976; as *Otopappus glabratus*.



FIGURE 33. *Otopappus curviflorus* (R. Br.) Hemsl. A, flowering shoot, $\times 1/2$; B, three heads, $\times 3$; C, style and anther, greatly enlarged; D, opened floret, $\times 13$; E, floret with palea, $\times 13$. From: Fieldiana, Bot. 24(XII):539. 1976; as *Notoptera scabridula*.



FIGURE 34. *Parthenium hysterophorus* L. A, habit, $\times 1/2$; B, heads, $\times 3\ 1/2$; C, part of capitulescence, $\times 1\ 1/2$; D, ray florets with adnate paleae, $\times 9$; E, phyllary with cypsela and paleae, $\times 9$; F, disc floret with palea, $\times 9$; G, opened disc floret, $\times 16$; H, cypsela with seed, $\times 9$; I, disc floret with paleae, $\times 9$; J, longisection through head, $\times 13$. From: Fieldiana, Bot. 24(XII):542. 1976.



FIGURE 35. *Perymenium grande* Hemsl. var. *grande*. A, flowering shoot, $\times 1/2$; B, head, $\times 2$; C, opened disc floret, $\times 12$; D, anther and style, \times greatly enlarged; E, disc floret without ovary, $\times 5$; F, ray floret, $\times 5$; G, disc cypsela, $\times 6\ 1/2$. From: Fieldiana, Bot. 24(XII):543. 1976; as *Perymenium grande*.

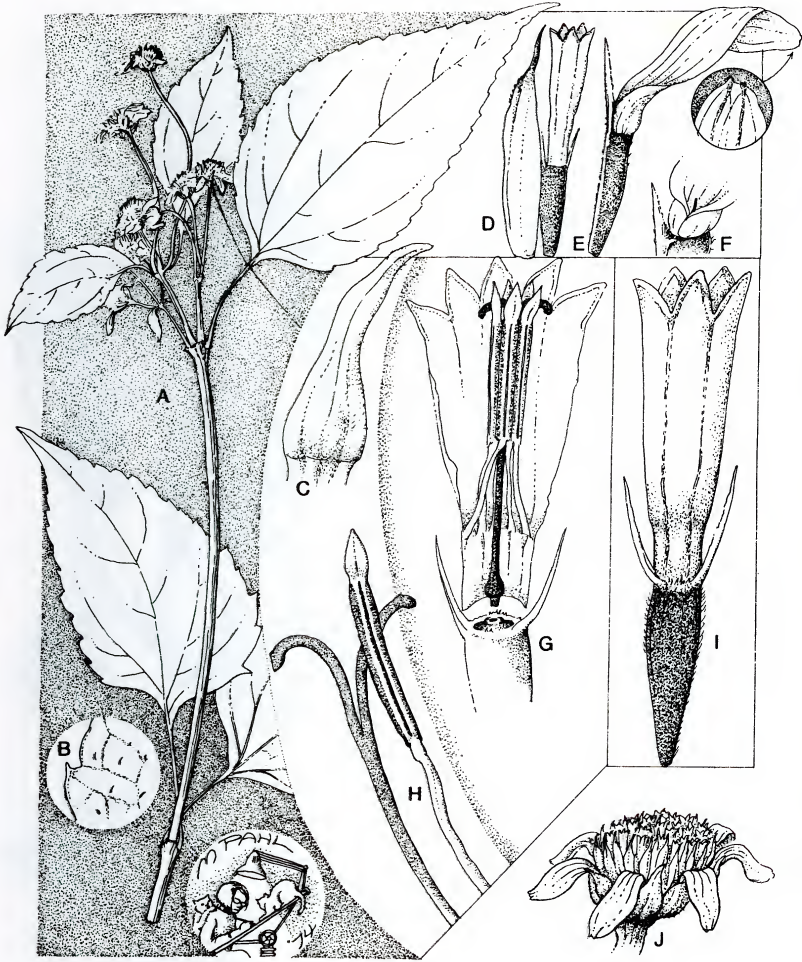


FIGURE 36. *Philactis zinniioides* Schrad. A, flowering shoot, $\times 1/2$; B, leaf detail, scale unknown; C, phyllary, $\times 5$; D, disc floret with palea, $\times 5\ 1/2$; E, ray floret, $\times 5\ 1/2$; F, detail of ray floret, $\times 5\ 1/2$; G, opened disc floret, $\times 13$; H, style and stamen, greatly enlarged; I, disc floret, $\times 13$; J, head, $\times 2$. From: Fieldiana, Bot. 24(XII):544. 1976; as *Philactis liebmannii*.



FIGURE 37. *Podachaenium eminens* (Lag.) Schultz-Bip. A, flowering shoot, $\times 1/2$; B, leaf, $\times 1/6$; C, head, $\times 2$; D, disc floret, $\times 7\ 1/2$; E, ray floret, $\times 7\ 1/2$; F, opened disc floret, $\times 17\ 1/2$; G, disc floret without ovary, $\times 17\ 1/2$; H, style branches, greatly enlarged; I, stamen, $\times 18$; J, ray corolla detail, $\times 15$; K, ray cypsela, $\times 15$. From: Fieldiana, Bot. 24(XII):545. 1976.



FIGURE 38. *Porophyllum punctatum* (Mill.) S. F. Blake. From: Fieldiana, Bot. 24(XII):578. 1976.



FIGURE 39. *Rensonia salvadorica* S. F. Blake. A, flowering shoot, $\times 1/2$; B, heads, $\times 3$; C, disc floret, $\times 6$; D, ray floret, $\times 6$; E, stamen, greatly enlarged; F, opened disc floret, $\times 7$. From: Fieldiana, Bot. 24(XII):547. 1976.



FIGURE 40. *Rojasianthe superba* Standl. & Steyererm. A, flowering shoot, $\times 1/2$; B, opened disc floret, natural size; C, habit, greatly reduced; D, section of stem, $\times 1/2$; E, disc floret, $\times 3\ 1/2$; F, ray floret, $\times 3\ 1/2$; G, palea, $\times 3\ 1/2$; H, cypsel, $\times 4$; I, opened disc floret, without style, $\times 7\ 1/2$; J, stamen and style branches, greatly enlarged. From: Fieldiana, Bot. 24(XII):548. 1976.



FIGURE 41. *Rumfordia guatemalensis* (J. M. Coult.) S. F. Blake. A, flowering branch, $\times 1/2$; B, opened disc floret, $\times 7 1/2$; C, anther, $\times 10$; D, ray floret with phyllary and disc floret with palea, $\times 5$. From Fieldiana, Bot. 24(XII):549. 1976; as *Rumfordia standleyi* (Steyerm.) Standl. & Steyerm.

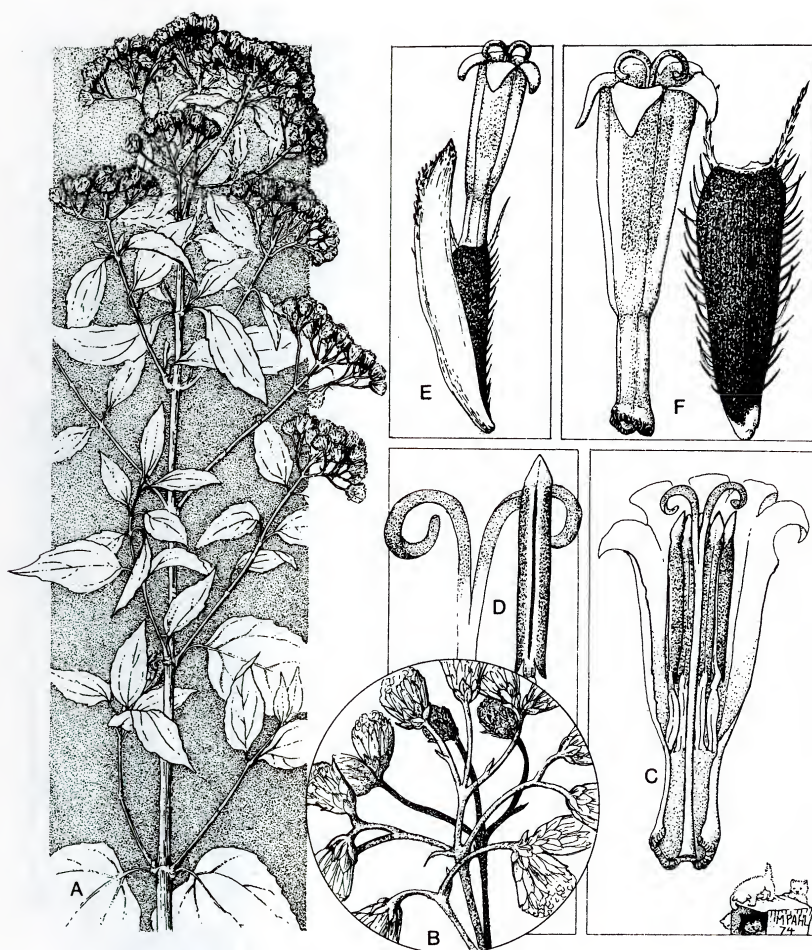


FIGURE 42. *Salmea scandens* (L.) DC. A, flowering shoot, $\times 1/2$; B, part of capitulescence, $\times 1\ 1/2$; C, opened floret, $\times 20$; D, style branches and anther, greatly enlarged; E, floret with palea, $\times 12\ 1/2$; F, floret (without ovary) and cypsela, $\times 18$. From: Fieldiana, Bot. 24(XII):551. 1976.

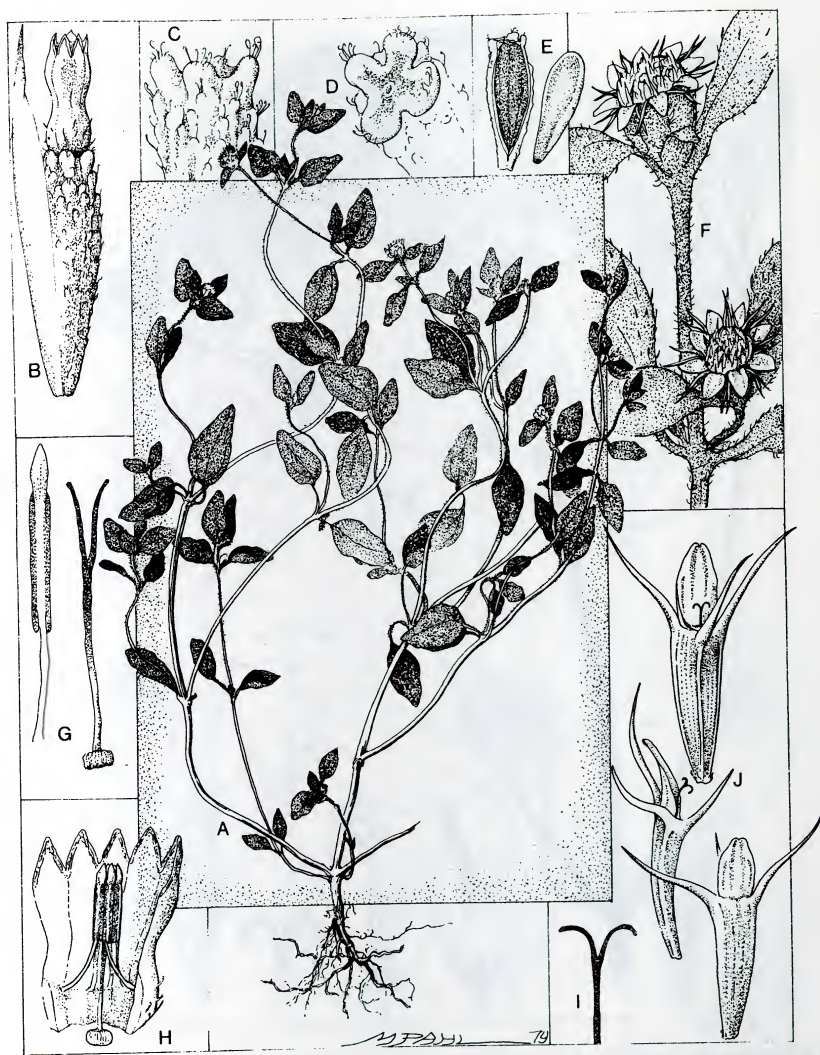


FIGURE 43. *Sanvitalia procumbens* Lam. A, habit, $\times 1/2$; B, disc floret with palea, $\times 9$; C, D, details of disc cypselae, $\times 20$; E, cypselus with seed, $\times 4\ 1/2$; F, heads, $\times 2$; G, stamen and style, greatly enlarged; H, opened disc floret, $\times 15$; I, ray style, greatly enlarged; J, ray cypselae with persistent corollas, $\times 6$. From: Fieldiana, Bot. 24(XII):552. 1976.



FIGURE 44. *Schistocarpha bicolor* Less. A, flowering shoot, $\times 1/2$; B, heads, $\times 3$; C, pistillate and bisexual florets with paleae, $\times 9$; D, opened disc florets with details of stamens and style, $\times 9$. From: Fieldiana, Bot. 24(XII):553. 1976; as *Schistocarpha platyphylla*.

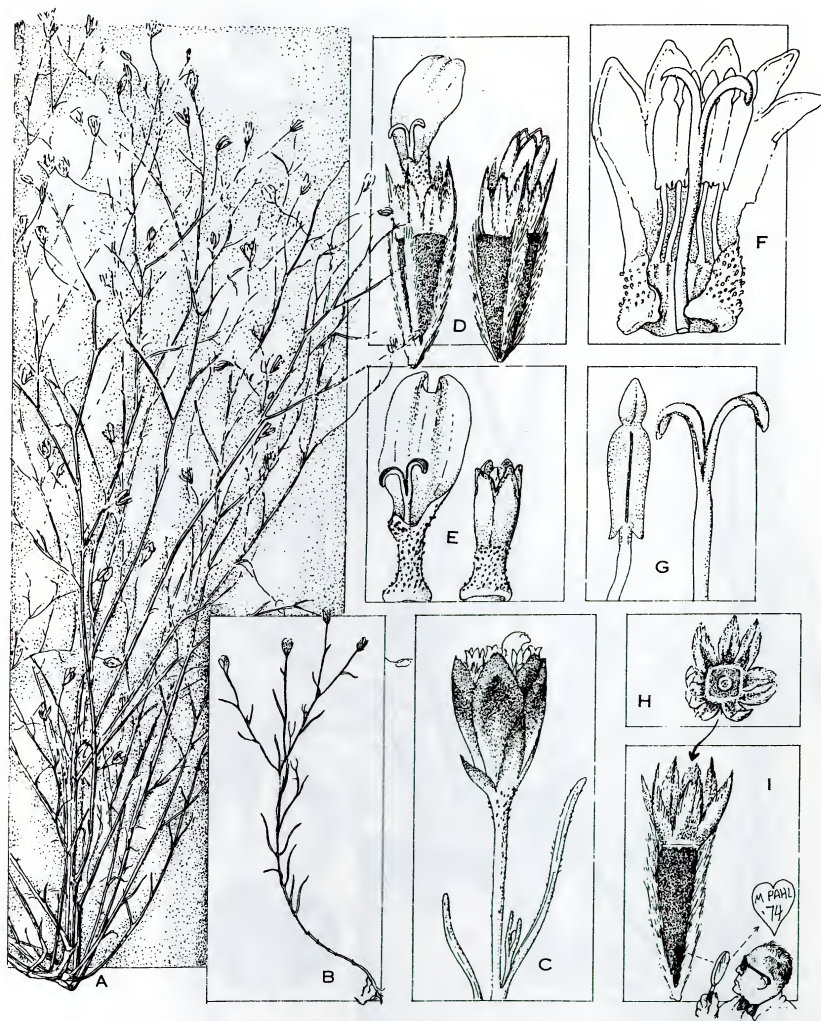


FIGURE 45: *Schkuhria pinnata* (Lam.) Kuntze ex Thell. A, flowering shoots, $\times 1/2$; B, habit, $\times 1/2$; C, head, $\times 5$; D, ray and disc florets, $\times 6$; E, ray and disc florets without ovaries, $\times 12\ 1/2$; F, opened disc floret, $\times 15$; G, stamen and style, much enlarged; H, I, pappus and cypsela, $\times 7\ 1/2$. From: Fieldiana, Bot. 24(XII):579. 1976; as *Schkuhria virgata*.



FIGURE 46. *Sclerocarpus divaricatus* (Benth.) Benth. ex Hemsl. A, flowering shoot, $\times 1/2$; B, ray corolla, $\times 3 1/2$; C, disc floret without ovary, $\times 3 1/2$; D, disc cypsel enclosed in palea, $\times 3 1/2$; E, details of disc floret, $\times 7$; F, four cypselae, three enclosed in paleae, $\times 5 1/2$; G, stamen, greatly enlarged; H, opened disc floret, $\times 7 1/2$. From: Fieldiana, Bot. 24(XII):554. 1976.

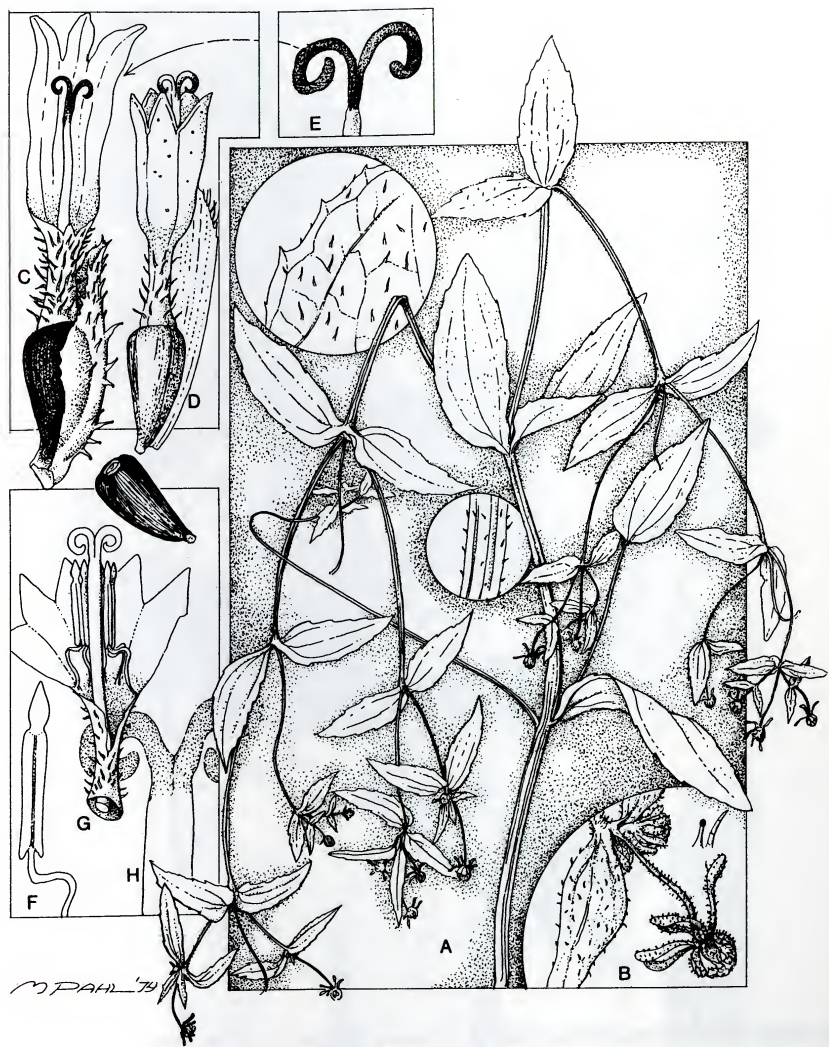


FIGURE 47. *Sigesbeckia agrestis* Poepp. & Endl. A, flowering shoot, $\times 1/2$; B, part of capitulescence, $\times 7$; C, ray floret with inner phyllary, $\times 14$; D, disc floret with palea, $\times 14$; E, style branches of ray floret, greatly enlarged; F, stamen, $\times 30$; G, opened disc floret, scale unknown; H, style branches, greatly enlarged. From: Fieldiana, Bot. 24(XII):556. 1976.

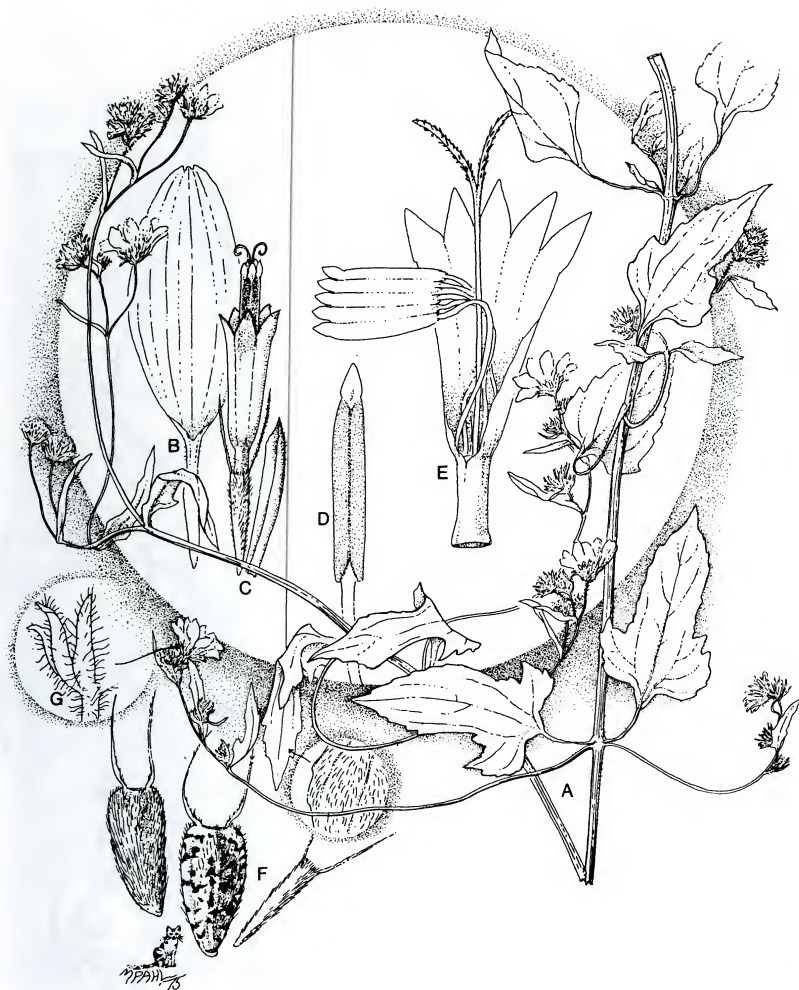


FIGURE 48. *Simsia amplexicaulis* (Cav.) Pers. A, flowering shoot, $\times 1/2$; B, ray floret, $\times 5$; C, disc floret with palea, $\times 5$; D, anther, greatly enlarged; E, opened disc floret, $\times 12 1/2$; F, two cypselae and an ovary, $\times 5$; G, phyllaries, greatly enlarged. From: Fieldiana, Bot. 24(XII):557. 1976.

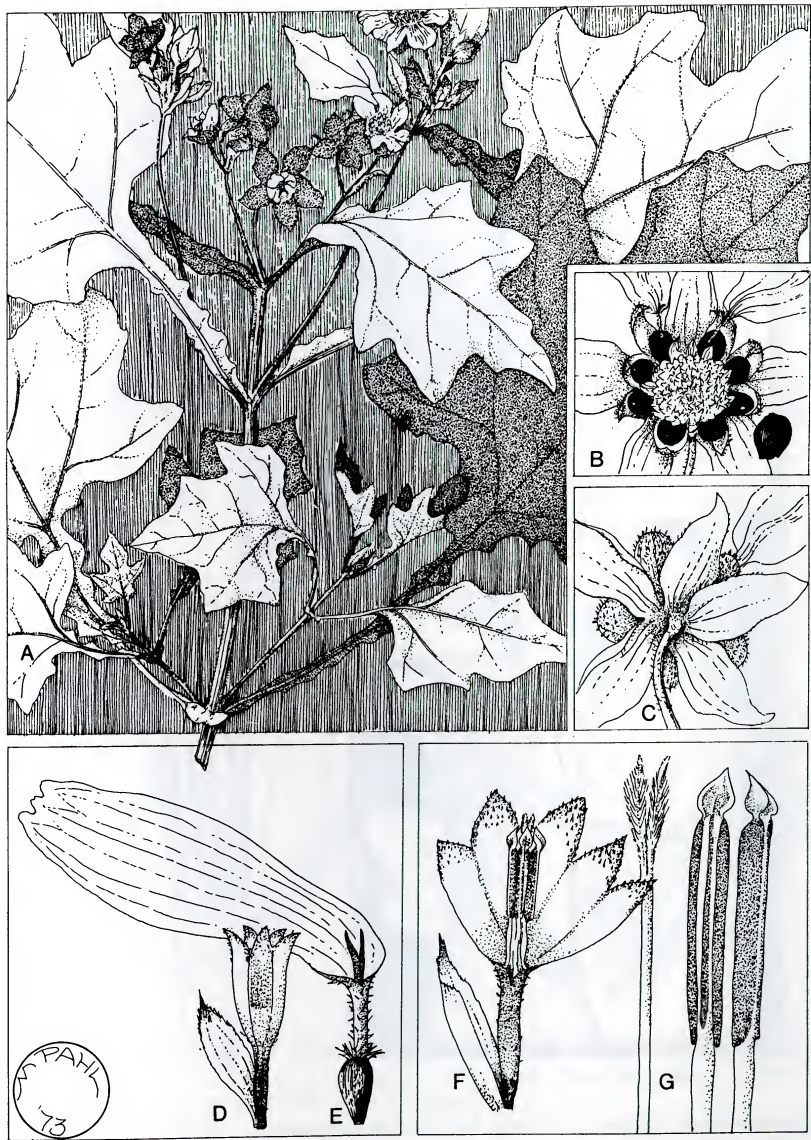


FIGURE 49. *Smallanthus maculatus* (Cav.) H. Rob. A, flowering shoot, $\times 1/2$; B, head in face view, $\times 1\ 1/2$; C, head, viewed from base, $\times 1\ 1/2$; D, disc floret with palea, $\times 4\ 1/2$; E, ray floret, $\times 4\ 1/2$; F, opened disc floret with palea, $\times 7\ 1/2$; G, style and two stamens, $\times 20$. From: Fieldiana, Bot. 24(XII):546. 1976; as *Polymnia maculata*.

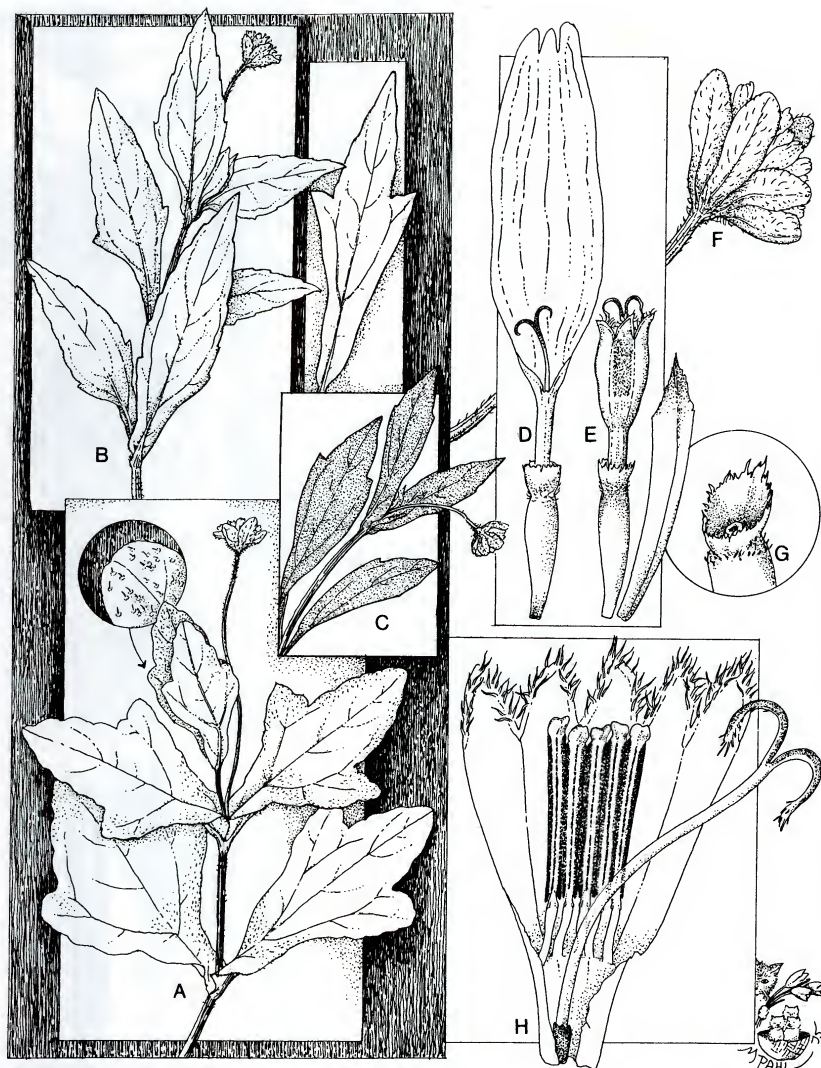


FIGURE 50. *Sphagneticola trilobata* (L.) Pruski. A, B, C, flowering shoots, $\times 1/2$; D, ray floret, $\times 7$; E, disc floret and palea, $\times 7$; F, head, $\times 2$; G, detail of young ovary, greatly enlarged; H, opened disc floret, $\times 12\ 1/2$. From: Fieldiana, Bot. 24(XII):568. 1976; as *Wedelia trilobata*.



FIGURE 51. *Squamopappus skutchii* (S. F. Blake) R. K. Jansen, N. A. Harriman, & L. Urbatsch. A, flowering shoot, $\times 1/2$; B, opened disc floret, $\times 12$; C, heads, $\times 3$; D, ray floret, $\times 7 1/2$; E, disc floret with palea, $\times 7 1/2$; F, stamen, greatly enlarged. From: Fieldiana, Bot. 24(XII):511. 1976; as *Calea skutchii*.

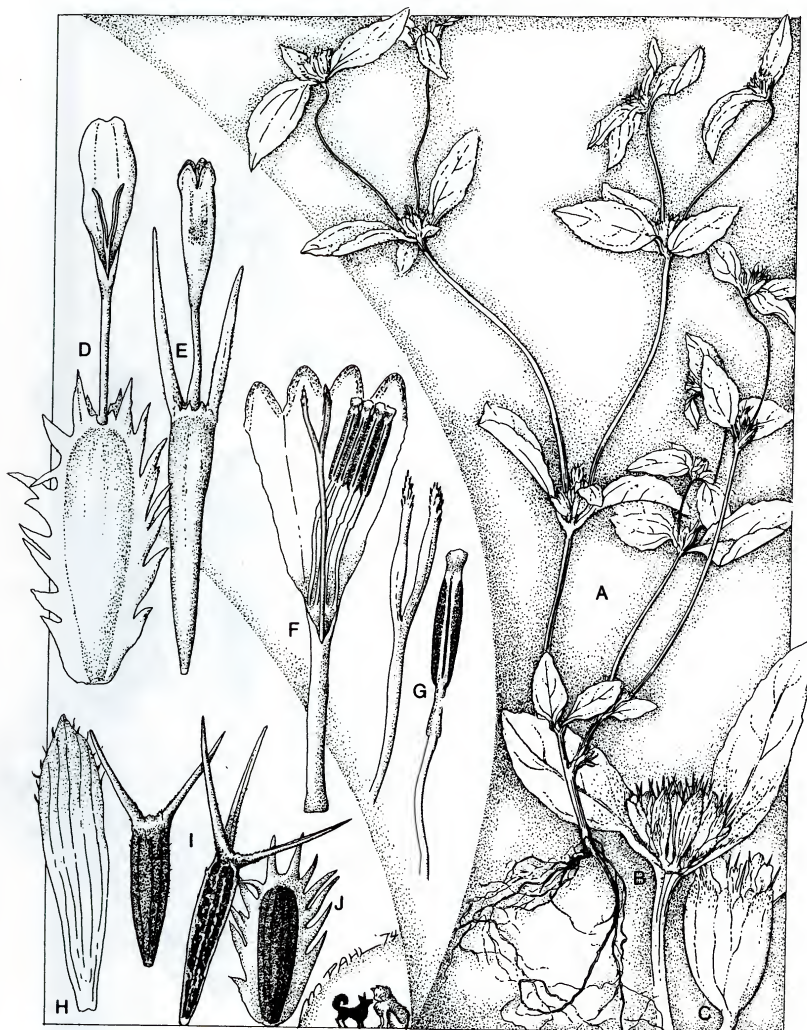


FIGURE 52. *Synedrella nodiflora* (L.) Gaertn. A, habit, $\times 1/2$; B, capitulescence, $\times 1\ 1/2$; C, head, $\times 3$; D, ray floret, $\times 10$; E, disc floret, $\times 10$; F, opened disc floret, $\times 18$; G, style and stamen, greatly enlarged; H, phyllary, $\times 6$; I, two disc cypselae, $\times 6$; J, ray cypselum, $\times 6$. From: Fieldiana, Bot. 24(XII):559. 1976.



FIGURE 53. *Tagetes nelsonii* Greenm. A, flowering shoot, $\times 1/2$; B, head and involucre, $\times 1\ 1/2$; C, ray floret, $\times 4$; D, disc floret, $\times 4$; E, opened disc floret, $\times 7\ 1/2$; F, anther, much enlarged. From: Fieldiana, Bot. 24(XII):580. 1976.



FIGURE 54. *Tithonia longiradiata* (Bertol.) S. F. Blake. A, flowering shoot, $\times 1/2$; B, detail of head, $\times 3$; C, stamen, $\times 14$; D, opened disc floret, $\times 12$; E, disc floret with palea, $\times 5$; F, ray floret, $\times 5$. From: Fieldiana, Bot. 24(XII):560. 1976.

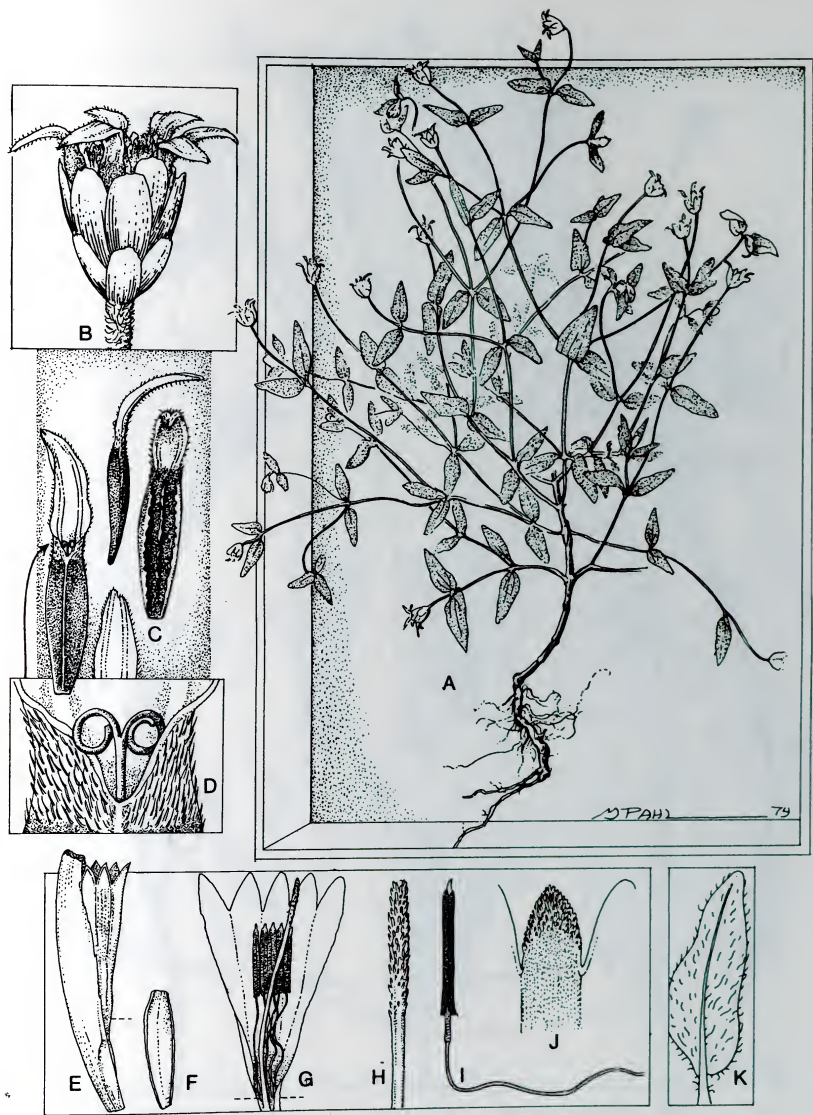


FIGURE 55. *Tragoceros americanus* (Mill.) S. F. Blake. A, habit, $\times 1/2$; B, head, $\times 4\ 1/2$; C, ray florets or young fruits with persistent corollas, $\times 5$; D, detail of ray corolla, greatly enlarged; E, disc floret with palea, $\times 8$; F, disc ovary, $\times 16$; G, opened disc floret, $\times 11$; H, style of disc floret, greatly enlarged; I, stamen, greatly enlarged; J, corolla detail, adaxial, greatly enlarged; K, leaf, abaxial, $\times 4$. From: Fieldiana, Bot. 24(XII):561. 1976; as *Tragoceras schiedeanum*.

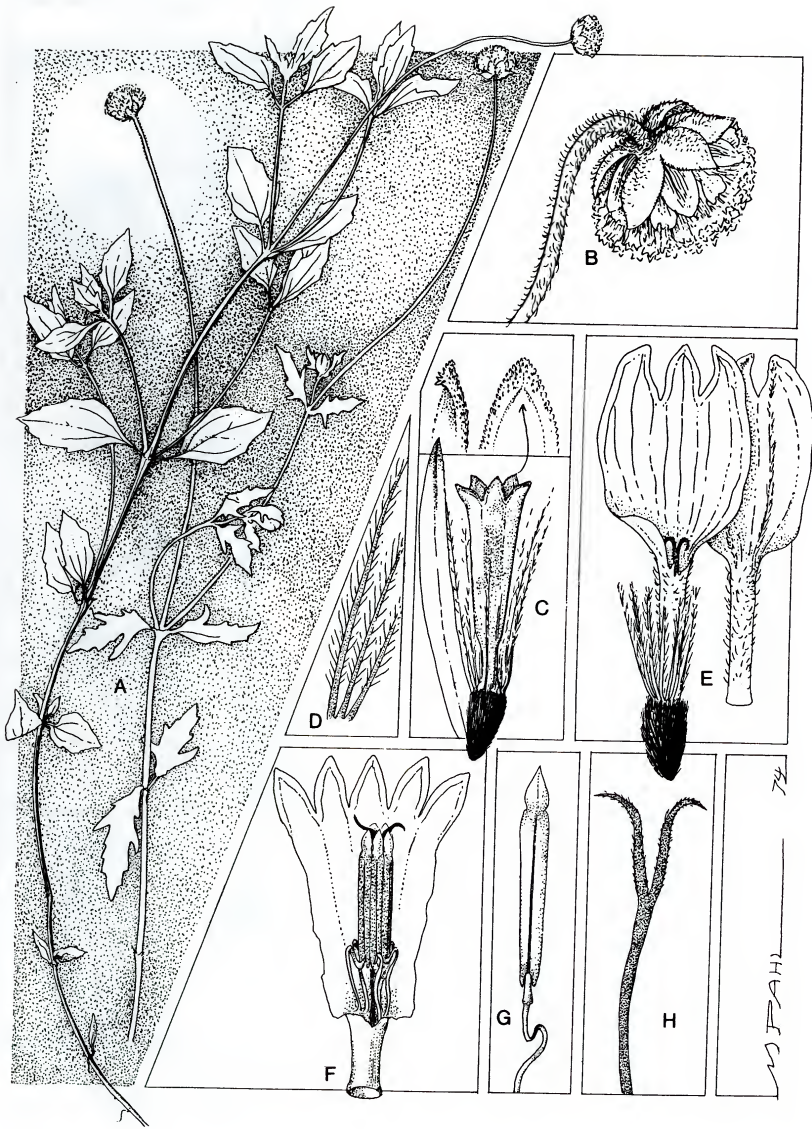


FIGURE 56. *Tridax procumbens* L. A, flowering shoots, $\times 1/2$; B, head, $\times 2$; C, disc floret with palea, $\times 7$; D, pappus bristles, greatly enlarged; E, ray floret plus ray corolla, $\times 7$; F, opened disc floret, $\times 10$; G, stamen, greatly enlarged; H, style branches, greatly enlarged. From: Fieldiana, Bot. 24(XII):563. 1976.

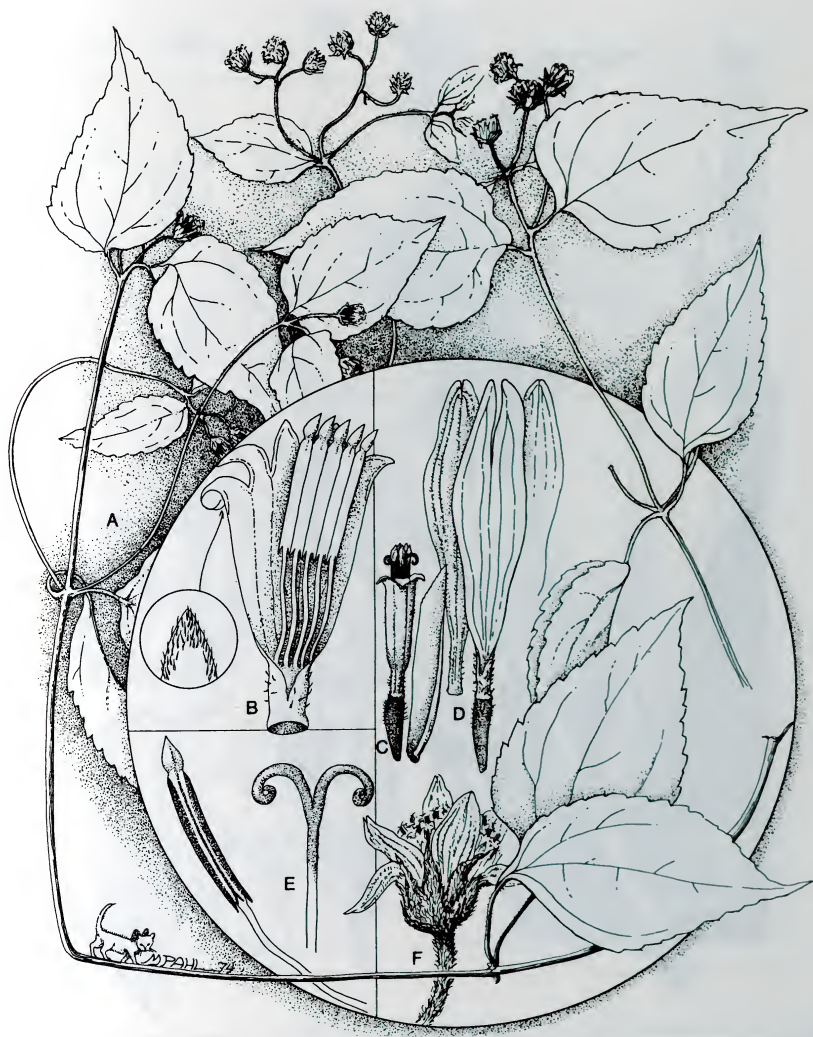


FIGURE 57. *Viguiera cordata* (Hook. & Arn.) D'Arcy. A, flowering shoots, $\times 1/2$; B, opened disc floret, $\times 10$; C, disc floret with palea, $\times 5$; D, ray floret plus corollas, $\times 5$; E, stamen and style, greatly enlarged; F, head, $\times 2 1/2$. From: Fieldiana, Bot. 24(XII):529. 1976; as *Hymenostephium guatemalense*.



FIGURE 58. *Viguiera dentata* (Cav.) Spreng. A, flowering shoot, $\times 1/2$; B, stamen and style, greatly enlarged; C, cypselae, $\times 9$; D, opened disc floret, $\times 11\ 1/2$; E, disc floret, $\times 6$; F, disc floret with palea, $\times 4$; G, ray floret, $\times 4$. From: Fieldiana, Bot. 24(XII):566. 1976.

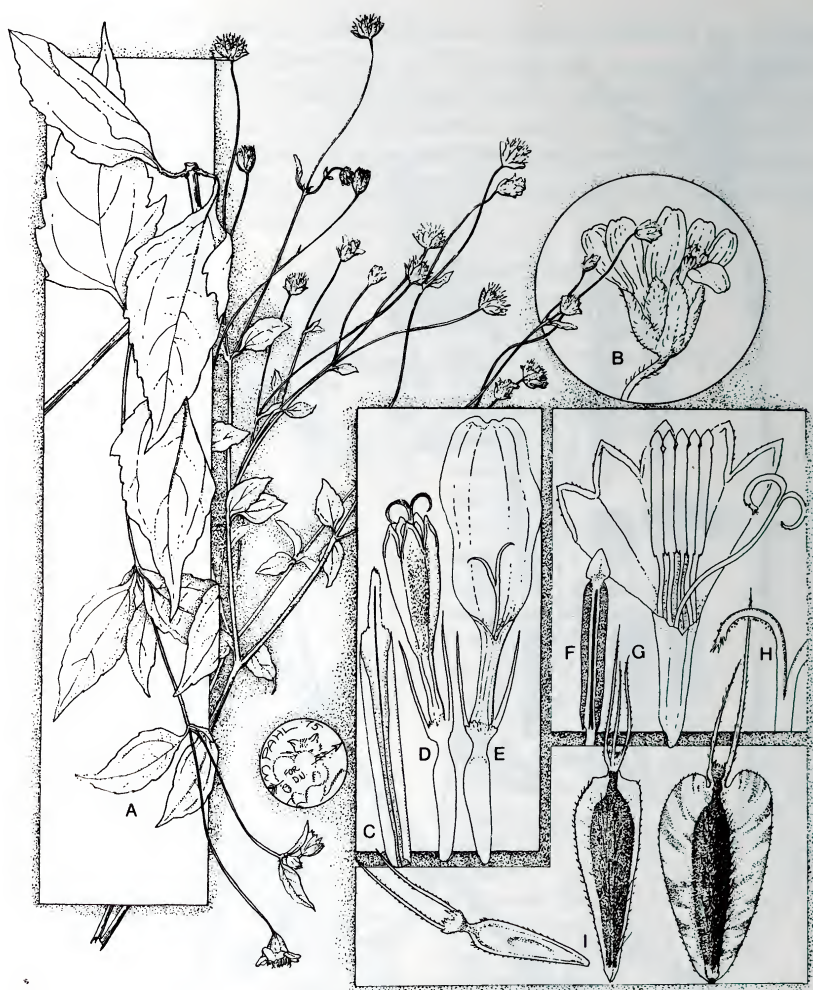


FIGURE 59. *Wedelia acapulcensis* Kunth var. *acapulcensis*. A, flowering shoot, $\times 1/2$; B, head, $\times 2\ 1/2$; C, palea, $\times 6$; D, disc floret, $\times 6$; E, ray floret, $\times 6$; F, anther, greatly enlarged; G, opened disc floret, $\times 11$; H, style branch, greatly enlarged; I, two cypselae and an ovary with pappus, $\times 5\ 1/2$. From: Fieldiana, Bot. 24(XII):567. 1976; as *Wedelia acapulcensis*.



FIGURE 60. *Zinnia peruviana* (L.) L. A, habit, $\times 1/2$; B, flowering shoots, $\times 1/2$; C, ray florets, $\times 2\ 1/2$; D, seed, $\times 2\ 1/2$; E, head with leaf or bract, $\times 2\ 1/2$; F, opened disc floret, $\times 7\ 1/2$; G, detail of disc-corolla lobe, $\times 15$; H, disc floret with palea and seed, $\times 3$; I, stamen, greatly enlarged. From: Fieldiana: Bot. 24(XII):570. 1976.

Appendix 1. *Collectors' names and abbreviations*. Chiapan collections are cited alphabetically by collectors' last names (except Breedlove, see following) and in ascending numerical order for multiple citings of one collector. Standard designations for herbaria are used (Holmgren, P. K. 1990. Index Herbariorum, ed. 8. New York Botanic Garden, Bronx, New York). First sets of collections made by D. E. Breedlove are housed in either CAS or DS; his duplicates will be found in other herbaria as well, especially MEXU and TEX. Breedlove collections are cited at ends of specimen lists and are cited by number only.

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Alexander, E. J.	[Alex]	Gomez Santiz, Feliciano	[GS]
Anderson, William R. et al.	[And]	González-Espinosa, M.	[GE]
Baldwin, J. T., Jr.	[Ba]	González González, Lorenzo	[GG]
Barrie, Fred	[Bar]	González-Quintero, L.	[G-Q]
Becker, Kenneth	[Beck]	González-Villareal, L. M.	[G-V]
Boege, W.	[Boe]	Green, H. T.	[HTG]
Bossé, G.	[Bo]	Hardison, L.	[Har]
Brett, John	[Br]	Harriman, N.	[Harr]
Brooks, R. W.	[Brooks]	Hartman, Ronald L. with Vicki Funk	[H&F]
Brunken, J. with C. Perino	[B&P]	Heath, M.	[He]
Cabrera, E.	[Cb]	Hernández Lopez, Javier	[HL]
Calzada, J. I.	[Calz]	Hernández M., Rafael	[HM]
Carlson, Margery C.	[MC]	Hernández Xolocotzi, Efraim	[HX]
Case, P.	[Case]	Hernández Xolocotzi, Efraim	
Castillo C., G.	[Cast]	with Aaron J. Sharp	[HX&S]
Chame, A. with A. Luna	[C&L]	Hilario H., L.	[Hi]
Chemsak, J. A.	[Chm]	Holmes, Walter C.	[Ho]
Chittenden, E. M.	[Chit]	Huft, Michael J.	[Huft]
Clarke, Oscar F.	[C]	Jack, A.	[Jack]
Collins, G. N.	[Collins]	Jackson, Raymond C.	[Jks]
Cowan, Clark	[Co]	Jones, R.	[Jo]
Croat, Thomas	[Cro]	Juzepczuk, Sergei V.	[J]
Cronquist, Arthur John	[Crq]	Kim, Ki-Joong	[Kim]
Cruden, Robert	[Cru]	King, Robert Merrill	[RMK]
Daniel, Thomas F.	[Dan]	Kliks, Michael	[KI]
D'Arcy, William G.	[D'A]	LaDuke, John	[LaD]
Davidse, Gerrit	[Da]	Landon, Kenneth	[Lan]
Delgado Salinas, A.	[Del]	Langman, Ida K.	[Lm]
Denton, Melinda L.	[Den]	Lathrop, Earl W.	[EL]
Dillon, M. O.	[Dillon]	Laughlin, Robert M.	[La]
Dressler, Robert L.	[Dr]	Lavin, Matt	[Lav]
Dreyer, David	[DD]	LeDoux, ? ? et al.	[LeD]
Dunn, David, et al.	[Dunn]	López Méndez, J.	[LM]
Feddema, Charles	[Fed]	López Pérez, Juliana	[Lo]
Fisher, G. L.	[Fi]	Luckow, Melissa	[Luc]
Fryxell, Paul A. et al.	[F]	Luna-Gómez, A.	[LG]
Funk, Vicki	[Funk]	Lundell, Cyrus L.	[Lu]
García P., José	[Gar]	MacDougall, Thomas	[Mc]
Gereau, Roy E.	[Ger]	Marin, Richard A.	[Ma]
Ghiesbreght, Auguste Boniface	[G]	Martínez-Ico, M.	[MI]
Gliessman, S. R.	[Glie]	Martinez S., E.	[Mz]
Goldman, Edward Alphonso	[Go]	Matuda, Eizi	[EM]
Gomez Gomez, Micaela	[MGG]	Meave, J.	[Mv]
Gomez López, Martín	[GL]	Mejía E., H. with A. Luna-G.	[M&L]

Melchert, Thomas	[Mel]	Sinaca Colín, S.	[Sin]
Mell, Clayton D.	[Me]	Sohns, Ernest R.	[So]
Morley, Thomas	[Mo]	Soule, Jacqueline	[Sl]
Nee, Michael	[Nee]	Spellenberg, Richard	[Spe]
Neff, J. L.	[Neff]	Spooner, David M.	[Spo]
Nelson, Edward William	[N]	Stall, ? ?	[Stall]
Ochoa Gaona, S. et al.	[Och]	Stuessy, Tod Falor	[Stu]
Palacios Espinosa, E.	[Pa]	Sundberg, Scott	[Sund]
Panero, Jose Luis	[Pan]	Téllez, O.	[Tel]
Pérez Gómez, Marcos	[PG]	Thorne, Robert F. with Earl Lathrop	[T&L]
Perez Hernández, F.	[PH]	Tillet, Stephen S.	[Ti]
Pérez López, J. M.	[PL]	Ton, Alush Shilom	[T]
Pérez M., Armando	[PM]	Torres, Andrew	[Tor]
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Italics = synonym, nomenclatural or taxonomic.

Plain Roman = accepted name, species or infra-specific taxon recorded from Chiapas.

Underlined = accepted name, taxon not recorded from Chiapas.

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